EFFECTS OF THE 1997 BALANCED BUDGET ACT ON MEDICARE MANAGED CARE PROVIDERS

By

JANICE ALANE HAUGE

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2001

ACKNOWLEDGMENTS

I must first thank my supervisory committee members. Dr. David E.M. Sappington, the chairman of the committee, generously gave his time, knowledge, and encouragement throughout my entire course of study. I always will be most grateful for his support. Dr. Steven Slutsky, a member, provided advice and insight at each level of progress. Dr. Chunrong Ai, a member, broadened my understanding of econometric analysis and in particular econometric research. Dr. David Figlio, a member, provided expert advice on econometric methods and data analysis. Dr. Heather Elms, the external member, encouraged me to expand my thinking beyond the normal scope of economic analysis. To each I extend my sincere thanks.

In addition to my committee members, I am indebted to Dr. Glenna Carr for the opportunity to work with her throughout the majority of my education. I also owe special thanks to Dr. Mark Jamison, for immeasurable assistance throughout my graduate studies. His guidance, direction, and friendship are most valuable.

I would also like to thank Dian Studstill for ensuring that my graduate program was in order, and Misty Swain for her administrative support.

I am most grateful to my family for their prayers, encouragement, and support at every step. Finally, I thank my husband, Mark Hauge, for making my graduate studies possible and for his infinite patience, encouragement, and love.

TABLE OF CONTENTS

Page

ACKNOWLEDGMENTS ii

ABSTRACT v

CHAPTERS

1 EFFECTS OF THE 1997 BALANCED BUDGET ACT ON MEDICARE MANAGED CARE PROVIDERS 1

2 THE EFFECT OF THE UNIFORM BENEFITS REQUIREMENT ON MEDICARE+CHOICE ORGANIZATIONS 4

- 2.1 Introduction 4
- 2.2 The Model 9
- 2.3 Analysis and Results 11
- 2.4 Conclusion 19

3 AN EMPIRICAL ANALYSIS OF PROVIDER EXIT IN THE MEDICARE MANAGED CARE MARKET 21

- 3.1 Introduction 21
- 3.2 Setting 25
- 3.3 Data and Methods 29
- 3.4 Evidence of Exit in the Medicare Managed Are Market 32
- 3.5 Empirical Analysis of the Causes of Provider Exit 40
- 3.6 Conclusion 76

4 CONTRADICTORY INCENTIVES IN THE MEDICARE+CHOICE MEDICAL SAVINGS ACCOUNT PROGRAM 79

- 4.1 Introduction 79
- 4.2 The Medical Savings Account Program 82
- 4.3 Inherent Conflicts in the MSA Program 85
- 4.4 Program Reform 90
- 4.5 Conclusion 93

5 CONCLUSION 94

APPENDICES

A PROOFS AND LEMMAS FOR CHAPTER 2 98

B SUPPLEMENTARY DATA FOR CHAPTER 3 124

C GLOSSARY 132

REFERENCES 137

BIOGRAPHICAL SKETCH 140

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

EFFECTS OF THE 1997 BALANCED BUDGET ACT ON MEDICARE MANAGED CARE PROVIDERS

By

Janice Alane Hauge

December 2001

Chairperson: David E.M. Sappington
Major Department: Economics

This dissertation examines the effects of the 1997 Balanced Budget Act (BBA) on Medicare managed care providers through the institution of the Medicare+Choice (M+C) Program. It is hypothesized that elements of the M+C Program caused managed care providers to exit counties in which they would otherwise have operated. The M+C Program created a new type of managed care offering that encompassed the traditional managed care plans under the broad designation of Medicare+Choice plan. It instituted new payment rate calculations for determining the monthly payment rate to Medicare managed care organizations (M+COs) providing healthcare services to Medicare beneficiaries. It instituted a uniform benefits requirement (UBR) that affected the benefits M+COs were required to offer to beneficiaries. Lastly, it created the Medicare Medical Savings Account Program (MSA) to increase beneficiaries' managed care options.

Theoretical analysis reveals one possible cause of M+CO exit to be the uniform benefits requirement (UBR). The UBR mandated that each M+CO must offer uniform premiums and benefits to all beneficiaries residing in the counties in which the M+CO's plan is offered. It is found that if competing M+COs have similar cost structures, if payment rates to M+COs are low, and if the disparity in payment rates among contiguous counties is large, M+COs may have an incentive to exit. Any time a M+CO exits, total social welfare decreases.

Empirical analysis reveals that exit did occur following the BBA. I find that this exit does not appear to be due to plan requirements within the M+C Program itself or to the change in the method of calculating payment rates to M+COs. It does appear to be due at least in part to the UBR.

The final element of the M+C Program considered is the Medicare MSA program. MSA programs combine a high deductible M+C plan with a medical savings account. This research illustrates that the profit incentives for M+COs to offer a MSA plan are inherently in conflict with the cost saving incentives of beneficiaries. Therefore, no plan will be offered. This conclusion is supported by evidence that no MSA plans have been proposed or implemented since the program's inception.

CHAPTER 1
EFFECTS OF THE 1997 BALANCED BUDGET ACT ON MEDICARE MANAGED CARE PROVIDERS

Through the introduction of the Medicare+Choice (M+C) Program, the 1997 Balanced Budget Act (BBA) fundamentally changed the way Medicare managed care organizations provide healthcare benefits to eligible Medicare beneficiaries. The M+C Program was created to replace the existing system of Medicare managed care contracts with a broader range of managed care options for beneficiaries, and to encourage greater provider participation in Medicare managed care.

This dissertation consists of three studies of the effects of the BBA on Medicare managed care providers.

The first study examines the social welfare effect of one element of the M+C Program, the uniform benefits requirement (UBR). The UBR mandated that each Medicare managed care organization (M+CO) must offer uniform premiums and benefits to all beneficiaries within the M+CO's service area. Service areas are comprised of a single county or contiguous counties defined according to general patterns of health care. Medicare reimbursement payment rates to M+COs serving Medicare beneficiaries are determined at the county level. Therefore, a service area with multiple counties may include counties with very different payment rates. Since M+COs face different cost structures across counties, profitability differs across counties if the same benefits are offered.

To determine the effects of the UBR on M+CO participation, I examine a homogenous good duopoly competition model in which M+COs simultaneously and independently choose the quantity of benefits they will offer to enrollees. I show that if M+COs face approximately the same cost structure across counties and payment rates to all counties within a service area are low, imposing the UBR generally increases welfare. However, if payment rates within a service area are disparate, M+COs have an incentive to exit a county in order to earn greater profits in another county. Whenever the UBR causes a M+CO to exit a county, welfare unambiguously decreases.

The second study empirically analyzes the effects of the BBA on Medicare managed care participation in all counties within the United States. First, I examine Medicare managed care participation data to determine if exit occurred following the BBA. Then I examine three elements of the BBA to determine their role in any observed exit. The first element is the M+C Program itself, specifically, the introduction of M+C plans that encompassed the traditional managed care plans. The second element is the new payment rate calculation method for determining the monthly payment to M+COs. The third element is the UBR.

Examination of the data and differencing analysis show that plan participation declined following the BBA. To determine the cause(s) of exit, I use a fixed effects linear regression model to estimate the effects of the BBA on the number of Medicare managed care providers per county. I find that neither changes in the manner in which payment rates are determined nor the creation of the M+C Program significantly affected provider participation. Instead, exit appears to be due at least in part to the UBR.

In my fourth chapter, I analyze the Medicare Medical Savings Account (MSA) Program, a program initiated by the BBA to provide another managed care alternative for Medicare beneficiaries. MSA plans combine a high deductible M+C plan with a contribution from the Health Care Financing Administration (HCFA) to a medical savings account for the enrolled beneficiary. I develop a model to examine the incentives for a M+CO to offer a MSA plan rather than (or in addition to) a M+C plan, and the incentives for a beneficiary to select a MSA plan rather than a M+C plan. I show that if M+COs prefer the more profitable plan, and beneficiaries prefer the least costly plan, there are no instances in which it is in both the M+CO's and the beneficiary's best interest to adopt a MSA plan. Given that beneficiaries will always choose to decrease their personal health care expenses, M+COs have no incentive to offer a MSA plan. The empirical evidence that no MSA plans have been implemented or even proposed since the program's inception supports this result.

This dissertation proceeds as follows. Chapter 2 examines the social welfare effect of the UBR on M+CO participation. Chapter 3 is an empirical study of M+CO participation and the effects of various elements of the BBA on participation decisions. Chapter 4 analyzes the MSA Program. Chapter 5 is the conclusion. The appendices contain all proofs, supplementary tables, and supplementary reference materials, and a glossary of terms that are used throughout the dissertation.

CHAPTER 2
THE EFFECT OF THE UNIFORM BENEFITS REQUIREMENT ON MEDICARE+CHOICE ORGANIZATIONS

2.1 Introduction

Through the introduction of the Medicare+Choice (M+C) Program, the Balanced Budget Act of 1997 (BBA) fundamentally changed the way Medicare managed care organizations provide healthcare benefits to eligible Medicare beneficiaries. The M+C Program was created to replace the existing system of Medicare managed care contracts with a broader range of options and a reformed method for determining the compensation of those organizations providing Medicare services to beneficiaries. Organizations participating in the M+C Program were called Medicare+Choice Organizations (M+COs). The new M+COs were subject to new requirements to help meet various goals of the BBA. One of these goals was to ensure Medicare managed care providers could no longer discriminate against beneficiaries based on the beneficiaries' county of residence or other demographic characteristics. To meet this goal, the BBA mandated that every individual entitled to receive Medicare benefits could enroll in any M+C plan offered in the county in which the individual resides.[1] Furthermore, the BBA instituted a uniform benefits requirement (UBR). The UBR stated that benefits and premiums (money paid to the M+CO by a beneficiary for Part B coverage, Part A coverage when required, and/or additional benefits[2]) must be uniform for all beneficiaries within a M+C plan's defined service area.[3]

---

[1] An exception was made for individuals with End Stage Renal Disease (ESRD), who were not permitted to enroll in the new M+C Program.

This chapter considers the effect of the uniform benefits requirement on total social welfare and assesses whether the UBR is likely to cause M+COs to withdraw from counties in which they would otherwise operate. It is found that if M+COs face approximately the same cost structure across counties and payment rates to all counties within a service area are low, imposing the UBR generally increases welfare. However, if payment rates within a service area are disparate, M+COs have an incentive to exit a county in order to earn greater profits in another. Whenever the UBR causes a M+CO to exit a county, welfare unambiguously decreases.

From 1997 to 1999, Medicare managed care providers began withdrawing from counties at an increasing rate. In approximately half of these cases, Medicare beneficiaries were left with no managed care options. Because the exit occurred directly following the BBA, it appeared that this exit might be due to requirements in the BBA.[4] Since the BBA was intended to increase Medicare beneficiaries' managed care choices, this exit was particularly alarming. Determining the cause of provider exit is therefore an important step toward reforming regulations within the BBA so that its initial goals might be realized.

---

[2] Medicare Part A is the part of Medicare that provides hospital insurance. Eligible beneficiaries receive Part A coverage without paying a premium if they or a spouse has 40 or more quarters of Medicare covered employment. Medicare Part B is the part of Medicare that provides medical insurance. Eligible beneficiaries pay a monthly premium for Part B coverage.

[3] A service area is a county or group of geographically adjacent counties. Each provider contracting with the Health Care Financing Administration (HCFA) to offer Medicare coverage must define the counties in which it proposes to operate. Upon HCFA's approval, these counties constitute the provider's service area.

[4] See Chapter 3 for details of exit statistics.

The potentially adverse effects of the UBR result from the structure of HCFA's compensation policy. HCFA provides M+COs a monthly per-enrollee payment regardless of the actual cost the M+CO incurs treating a particular patient. Payment rates are historically based on the average cost of Medicare-covered services in a county. Because treatment costs may differ from one county to another, payment rates in different counties within a service area may differ. If a M+CO is able to treat patients at a lower cost than the per-enrollee payment it receives from Medicare, it must provide additional services, or benefits, to all beneficiaries enrolled in the M+CO's plan; M+COs are not permitted to earn extra-normal profit from serving Medicare enrollees.[5] If a M+CO incurs greater cost in treating an enrollee than the payment it receives, it must bear that loss.

Historically, Medicare managed care providers tended to locate plans in counties with the highest payment rates. Because these counties attracted a greater number of providers, competition was greater than in counties with low payment rates; therefore, more generous benefits packages had to be offered to attract enrollees. Prior to the BBA, Medicare providers were permitted to vary benefits packages by county, using non-Medicare funds to finance the cost of providing benefits greater than the minimum required by Medicare. This allowed providers to compete in counties with the highest payment rates and still operate in lower payment counties offering lower benefits packages. This was known as the flexible benefits policy. The BBA's institution of the uniform benefits policy effectively ended this flexible benefits policy. The UBR required premiums and benefits to be uniform under a M+C plan throughout that plan's defined service area. This meant that any M+CO that was offering higher benefits in one county than in another county in the same service area must alter the benefits it offered in one county or in the other, or both.[6] Since M+COs face different cost structures across counties, profitability differs across counties if the same benefits are offered. Under the UBR, lower payment counties may become unprofitable for M+COs that must offer high benefits in higher payment counties within the same service area in order to effectively compete for enrollees.

---

[5] Under the BBA, M+COs were permitted to retain a level of profits equal to those profits earned from the M+CO's non-Medicare services.

The intent of the uniform benefits requirement seems similar to that of other legislation enacted under universal service principles.[7] Forcing M+COs to offer the same benefits they offer in high payment counties to beneficiaries in lower payment counties ensures that Medicare enrollees are not discriminated against due to their geographic location. It is hypothesized that the government instituted the uniform benefits requirement because it believed M+COs were over-supplying benefits in the higher payment counties in an attempt to attract enrollees and receive the high per-enrollee payment. Alternatively, M+COs may have been under-supplying benefits in the lower payment counties in an attempt to earn as much profit as possible given the low payment rate. By requiring uniform benefits, M+COs would be forced to limit unnecessary benefits in the high payment counties and to provide greater benefits in the low payment counties.

---

[6] The Balanced Budget Act also altered the formula by which M+COs are paid for their Medicare enrollees. Payment rates to M+COs were quite disparate within service areas, and in many cases no longer accurately reflected costs. The new payment scheme was designed to eliminate disparate payment rates in adjacent counties. Payment rate changes were scheduled to be completed in 2003.

[7] Anton et al. (1998), and Crew and Kleindorfer (1998) explore market entry and monopoly under universal service obligations. Parallels can be drawn between their observations and observations of the Medicare program.

Health care financing has received considerable attention from health care economists and others. In the early 1980s, Richard Foster addressed cost-based reimbursement and cost shifting under cost-based reimbursement plans in the healthcare industry (see Foster, 1982 and 1985). More recently, Medicare and the BBA have been specifically addressed (see Victor Fuchs, 1999; Charles Kahn and Hans Kuttner, 1999; Bruce Vladeck, 1999; and Gail Wilensky and Joseph Newhouse, 1999). However, the effects of the uniform benefits requirement on Medicare+Choice providers have not yet been addressed. Medicare Payment Advisory Commission (MEDPAC) reports to Congress indicate that research is necessary to determine the cause of recent departures from the Medicare program; however, these reports also suggest possible concern over the UBR, as they recommend allowing M+COs to continue to offer flexible benefits. MEDPAC reports specifically indicate, "Without this flexibility, organizations may withdraw from counties with lower payments, reducing beneficiary access to new options,"(MEDPAC, 1999, p. 26). This presumption has not yet been proven.

A formal analysis of the effect(s) of the UBR on Medicare managed care provider participation proceeds as follows. The model is described in detail in Section 2.2; the main analysis is developed and results are reported in Section 2.3; and Section 2.4 is the conclusion in which the findings and underlying intuition are summarized.

2.2 The Model

The model is a homogenous good duopoly competition model in which M+COs simultaneously and independently choose the quantity of benefits to offer. Then, Medicare beneficiaries learn the benefits offered and choose with which M+CO to enroll. The assumptions of the model are as follows.

There are two counties, a low payment county (L), and a high payment county (H). Payment level refers to the level of per-enrollee payment from Medicare to the M+CO. $R^k \equiv$ per-enrollee payment in county k, $k \in \{L, H\}$. R^k is exogenously determined.[8]

There are two M+COs, a low cost M+CO ($M+CO_1$) and a high cost M+CO ($M+CO_2$).[9]

The low cost M+CO has a cost advantage in all counties: $C_1^k(\theta) < C_2^k(\theta)\ \forall\ \theta \geq \theta_0$, $k \in \{L, H\}$.

$C(\theta_i^k) = [\beta + c_i q_i^k(\theta_i^k)]$ where $c_i q_i^k > 0$ = M+CO i's marginal cost of serving q_i^k enrollees benefits θ_i^k. β is the fixed per-enrollee cost of operating in a county. For simplicity, costs are assumed to increase at a constant rate as the level of benefits provided increases.

A M+CO's operating cost is the same in the high payment and the low payment counties: $C_i^L(\theta) = C_i^H(\theta)\ \forall\ \theta \geq \theta_0$, $i = 1,2$.[10]

The high cost M+CO cannot profitably provide any level of benefits in the low payment county: $[R^L - C_2(\theta)]n^L < 0 \;\; \forall \;\; \theta \geq \theta_0$.[11]

---

[8] In practice, the county per-enrollee payment rate is based on the historical cost to provide covered Medicare services within the county.

[9] Equilibria generally do not exist in settings where firms have equal costs. Proofs for all formal results in Chapter 2 are provided in Appendix A.

[10] This assumption simplifies the analysis but does not affect the results.

$\theta_i^k \equiv$ the level of benefits M+CO i offers in county k, i = 1,2, k $\in\{L, H\}$. Basic benefits (θ_0) are the minimum allowable benefits a M+CO must offer in order to serve Medicare enrollees.

M+COs compete for enrollees through their choice of benefits offered (θ_i^k), i = 1,2, k $\in\{L, H\}$.[12]

$n^k = (q_i^k + q_j^k) \equiv$ total number of potential enrollees in county k, k $\in\{L, H\}$. All potential enrollees choose to enroll, since there is no cost associated with eligibility for Medicare benefits.

$q_i^k(\theta_i^k, \theta_j^k) \equiv$ the number of enrollees served by M+CO i in county k, i,j=1,2, i≠j, k $\in\{L, H\}$.

An enrollee can enroll with only one M+CO.

Demand is defined as $q_i^k(\theta_i^k, \theta_j^k)$, where $q_i^k = \begin{cases} 0 & \text{if } \theta_i^k < \theta_j^k \\ n^k & \text{if } \theta_i^k \geq \theta_j^k \end{cases}$ i=1, j=2 and k $\in\{L, H\}$.

All consumers choose the low cost M+CO when indifferent.[13]

$U(\theta_i^k) \equiv$ enrollee satisfaction or utility given benefits θ_i^k offered by M+CO i, i = 1,2 in county k, k $\in\{L, H\}$. Enrollees have positive but decreasing marginal utility of consumption. $U_\theta(\theta_i^k) > 0$, $U_{\theta\theta}(\theta_i^k) < 0$.

---

[11] This assumption simplifies the analysis. Qualitative results are unaffected by the assumption. See proof in Appendix A.2.

[12] Medicare patients enrolled in M+COs typically make either no payments or standard co-payments. The majority (two-thirds) of Medicare managed care providers did not charge any premium in 1997; therefore, this analysis assumes M+COs do not compete based on premiums.

[13] Defining demand such that each firm serves half ($n^H/2$) of county H when benefits provided are equal does not alter the main findings of the paper. Proof is available upon request.

Utility in counties L and H is assumed to be equal for the same level of benefits offered: $U^L(\theta_i^k) = U^H(\theta_i^k)\ \forall\ \theta_i^k,\ i = 1,2,\ k \in \{L, H\}$.

$U(\theta_0^k) \geq C_1(\theta_0^k),\ k \in \{L, H\}$. Utility when basic benefits are offered is at least as great as M+CO$_1$'s cost of providing basic benefits in both counties.[14]

Welfare refers to total social welfare, which is the sum of enrollees' total utility and M+COs' profits: $W=\Sigma_{i=1,2}\Sigma_{k=L,H}[U(\theta_i^K) - R^k]q_i^k\ + [R^k - c_i(\theta_i^K)]q_i^k$.

The welfare maximizing level of benefits (θ*) is that level of benefits at which the enrollees' marginal utility of benefits equals the M+CO's marginal cost of providing those benefits: (θ*) solves $U_\theta(\theta_i^k) = C_\theta(\theta_i^k),\ i =1,2,\ k \in \{L, H\}$.

2.3 Analysis and Results

The main result of the analysis, as reported in Proposition 1 below, relies on Lemmas 1 through 3. These lemmas define conditions under which M+CO$_1$ will operate in each county, and conditions under which M+CO$_2$ will operate in county H. They also indicate the level of benefits each M+CO offers under these conditions. This information helps to clarify the intuition of the result. The subsequent corollaries define conditions under which welfare increases under the uniform benefits policy when M+CO$_1$ serves all enrollees in both counties.

Lemma 1: The high cost M+CO will not operate (i.e., $q_2^k = 0\ \forall\ k \in \{L, H\}$) in either county if the uniform benefits requirement is not imposed.

---

[14] It is assumed that utility when basic benefits are offered is at least as great as M+CO$_1$'s cost of providing basic benefits in both counties for simplicity only. Generalizing this assumption to $U(\theta_0^k) \geq C_i(\theta_0^k)\ \forall\ i = 1,2,\ k \in \{L, H\}$ does not affect the results of the analysis.

Suppose the payment rate in county H is such that M+CO_2 could profitably operate in county H if there were no competition. Any county in which M+CO_2 can profitably operate must also be profitable for M+CO_1. Without the uniform benefits requirement, M+CO_1 can always profitably offer a higher level of benefits in county H than M+CO_2 can profitably offer. By raising benefits above the level M+CO_2 can profitably offer, M+CO_1 is able to enroll all beneficiaries in (i.e., capture) the county. Therefore, M+CO_1 has an incentive to raise benefits high enough to capture county H, and M+CO_2 will not operate if the UBR is not imposed.[15]

Lemma 2: Suppose the high cost M+CO can profitably offer more than basic benefits in county H. Then the low cost M+CO will not offer uniform benefits in counties L and H if the uniform benefits requirement is not imposed.

By assumption, M+CO_2 can profitably operate only in county H. Therefore, M+CO_1 can offer minimum benefits (θ_0) in county L and capture that county. In county H, M+CO_1 must offer a level of benefits M+CO_2 cannot profitably offer in order to capture county H. Define $\theta^{\sim}$ to be the maximum level of benefits M+CO_2 can profitably offer; $\theta^{\sim}$ will be the level of benefits at which payment equals cost, i.e., $R^H = C_2(\theta^{\sim})$.[16] Hence, $\theta_1^L = \theta_0$ and $\theta_1^H = \theta^{\sim}$ which implies that without the UBR, if $\theta^{\sim} > \theta_0$, M+CO_1 offers different benefits across counties ($\theta_1^L < \theta_1^H$).

When uniform benefits are required, M+CO_1 must alter the benefits it offers in one or both counties. For M+CO_1 to maintain its monopoly in both counties, it must offer at least the competitive level of benefits in the high payment county to capture the county from M+CO$_2$. When uniform benefits are required, M+CO$_1$ must also offer this level of benefits in the low payment county. M+CO$_1$ will provide benefits $\theta^{\sim}$ to all enrollees in both counties if the profit from doing so is greater than the maximum profit it can earn by serving county H only or county L only, i.e., if the following conditions are met: $[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^H - C_1(\theta^{\sim})]n^H$

---

[15] This conclusion holds more generally so that the high cost firm will not operate in either county if the UBR is not imposed, as is shown in the proof of Lemma 1.

[16] Define $\theta^{\sim}$ as the competitive level of benefits. Also, define the competitive equilibrium as the equilibrium in which the UBR is imposed and M+CO_1 offers all enrollees in both counties benefits $\theta^{\sim}$.

$$\Rightarrow \quad [R^L - C_1(\theta^{\sim})]n^L \geq 0, \qquad \text{(C1)}$$

$$\text{and} \quad [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^L - C_1(\theta_0)]n^L \qquad \text{(C2)}$$

(C1) states that it is more profitable for M+CO$_1$ to operate in both counties than only in county H; (C2) states that it is more profitable for M+CO$_1$ to operate in both counties than only in county L. If (C1) and (C2) are met, M+CO$_1$ provides benefits $\theta^{\sim}$ to all enrollees in both counties and M+CO$_2$ does not operate.

Lemma 3: The low cost M+CO will serve all enrollees in both counties when the uniform benefits requirement is imposed if and only if (C1) and (C2) hold.

Suppose (C1) and (C2) hold. Then the welfare effect of M+CO$_1$ offering benefits $\theta^{\sim}$ to all enrollees in both counties is determined by comparing welfare with and without the UBR imposed, as expressed by condition (C3).

$$U(\theta^{\sim}) - U(\theta_0) > C_1(\theta^{\sim}) - C_1(\theta_0) \qquad \text{(C3)}$$

(C3) states that welfare increases if the gain in utility due to increasing benefits from θ_0 to $\theta^{\sim}$ in the low payment county is greater than the cost of providing those additional benefits in the low payment county.[17]

---

[17] Enrollees in county H receive the same level of benefits ($\theta^{\sim}$) with or without the UBR.

Proposition 1: When the UBR is imposed, welfare increases if and only if conditions (C1) through (C3) hold.

When the UBR is imposed, welfare increases if the low cost M+CO serves all enrollees in both counties and provides additional benefits in the low payment county such that the utility enrollees receive from those additional benefits is greater than the M+CO's incremental cost to provide them.

Without the UBR, M+CO$_1$ provides basic benefits (θ_0) in county L and the competitive level of benefits ($\theta^{\sim}$) in county H. When the UBR is imposed, if (C1) and (C2) hold, M+CO$_1$ earns greater profits offering benefits $\theta^{\sim}$ in both counties L and H than it could earn operating in only county L or only county H; M+CO$_1$ maximizes its profits by providing benefits $\theta^{\sim}$ to all enrollees in counties L and H. Therefore, enrollees' benefits in county L increase from θ_0 to $\theta^{\sim}$, and enrollees' benefits in county H remain unchanged at $\theta^{\sim}$ when the UBR is imposed.

(C3) states that under the UBR, the increase in benefits to county L results in an increase in total welfare if the utility enrollees in county L receive from the extra benefits is greater than M+CO$_1$'s cost of providing those additional benefits: $U(\theta^{\sim}) - U(\theta_0) > C_1(\theta^{\sim}) - C_1(\theta_0)$. Stated differently, for welfare to increase under the UBR, the difference between utility and cost at the new level of benefits provided must be greater than the difference between utility and cost at basic benefits:

$$U(\theta^{\sim}) - C_1(\theta^{\sim}) > U(\theta_0) - C_1(\theta_0). \qquad \text{(C3a)}$$

When enrollees receive only basic benefits, by assumption the utility they receive from those benefits is at least as great as M+CO$_1$'s cost of providing the benefits ($U(\theta_0) - C_1(\theta_0) \geq 0$). Also by assumption, as benefits increase, utility increases at a decreasing rate, while costs increase at a constant rate. Therefore, the difference between utility and cost increases as the level of benefits increases from θ_0 to θ^* because utility increases with benefits offered faster than cost increases with benefits offered in this range (i.e., the slope of the utility curve is greater than the slope of the cost curve from θ_0 to θ^*). This implies (C3a) holds for all $\theta^{\sim} \leq \theta^*$, where θ^* is the welfare maximizing level of benefits at which marginal utility equals marginal cost (i.e., the slopes of the utility and cost curves are equal). Increasing benefits beyond θ^* decreases the difference between the utility and cost curves, since cost increases faster than utility (i.e., the slope of the cost curve is greater than the slope of the utility curve). This difference continues to decrease until θ^{χ}, where the difference between utility and cost equals the difference between utility and cost at θ_0. This implies (C3a) holds for all $\theta^{\sim} < \theta^{\chi}$, where θ^{χ} solves $U(\theta^{\sim}) - U(\theta_0) = C_1(\theta^{\sim}) - C_1(\theta_0)$. Therefore, if M+CO$_1$ maximizes its profits by serving all enrollees in counties L and H any $\theta^{\sim} < \theta^{\chi}$, welfare improves when the UBR is imposed.

If any of these conditions (C1)-(C3) do not hold, welfare will not increase with the uniform benefits policy.[18] Figure 2-1 helps to demonstrate Proposition 1.

Assume M+CO$_1$ operates in both counties and offers the high payment county's competitive level of benefits in both counties L and H. In the diagram, $U(\theta_0) - C_1(\theta_0) = 0$; the difference is zero again at θ^{χ} where $U(\theta^{\chi}) - C_1(\theta^{\chi}) = 0$. Increasing benefits beyond θ^{χ} violates (C3). (C3) requires $U(\theta^{\chi} + \varepsilon) - C_1(\theta^{\chi} + \varepsilon) > U(\theta_0) - C_1(\theta_0)$. But, $U(\theta^{\chi} + \varepsilon) - C_1(\theta^{\chi} + \varepsilon) < 0$ and $U(\theta_0) - C_1(\theta_0) = 0$. Therefore $U(\theta^{\chi} + \varepsilon) - C_1(\theta^{\chi} + \varepsilon) < U(\theta_0) - C_1(\theta_0)$ and (C3) does not hold. If $\theta^{\sim} = \theta^{\chi}$, imposing the UBR does not increase or decrease total social welfare. Corollary 1: Suppose conditions (C1) and (C2) hold. Then when the UBR is imposed, welfare will increase if the competitive level of benefits ($\theta^{\sim}$) is no greater than the welfare maximizing level of benefits (θ^*).

---

[18] See Lemmas 4 - 6 in Appendix A.

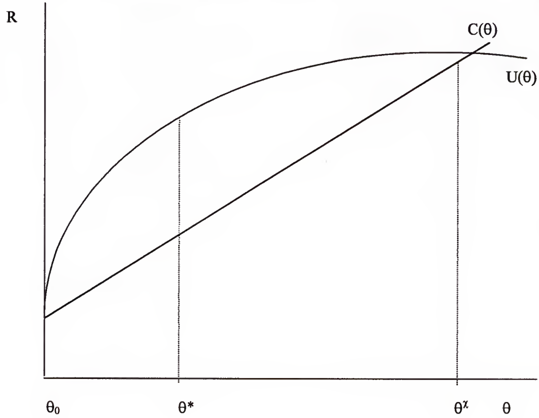

Figure 2-1
Welfare Maximizing Level of Benefits

The socially optimal level of benefits θ^* is always less than the maximum level of benefits that satisfies (C3) ($\theta^* < \theta^{\chi}$). Any level of benefits that satisfies (C3) (any $\theta < \theta^{\chi}$) increases welfare, therefore, supplying θ^* always increases welfare. By definition, θ^* is the welfare maximizing level of benefits. For this reason, an equilibrium in which $M+CO_1$ supplies to both counties a level of benefits θ^* is optimal. Any welfare level attained by providing benefits greater than θ^* may also be attained by providing benefits less than or equal to θ^*.[19]

Corollary 2: Suppose the difference in M+COs' costs as defined by $C_1(\theta^{\sim}) - C_2(\theta^{\sim})$ is sufficiently small. Then M+CO_1 will offer basic benefits (θ_0) in the competitive equilibrium.

As a M+CO's cost advantage decreases, the incentive to provide greater benefits to capture county H decreases. By offering higher benefits, profits are diminished since the per-enrollee cost increases while per-enrollee payments remain the same. The profit M+CO_1 is able to earn solely by capitalizing on its cost advantage in county H decreases as its cost advantage decreases.

The competitive equilibrium in which M+CO_1 offers basic benefits requires that the difference between the payment rate in county H and M+CO_1's costs to supply basic benefits is sufficiently small. As payment in county H increases, M+CO_1's incentive to exit county L increases. Since $\theta^{\sim}$ is determined by the maximum benefits M+CO_2 can profitably offer, profit does not increase in county H when the payment rate in county H increases. An increase in the payment rate means M+COs are able to (and therefore must) increase benefits in order to capture the county. Increasing payment in county H simply increases the incentive to exit the less profitable county. If M+CO_1's cost advantage is sufficiently small and the difference in payment rates to counties H and L becomes sufficiently large, an equilibrium in which M+CO_1 offers benefits $\theta^{\sim}$ in both counties does not exist. Corollary 3: Suppose the difference in payment rates is greater than the difference in costs as defined by $C_1(\theta^{\sim}) - C_2(\theta^{\sim})$. Then imposing the UBR will decrease welfare.

---

[19] All benefit levels greater than θ^* result in a level of welfare that can be attained at benefit levels less than θ^*, since the difference between utility and cost first increases to a maximum at θ^* and then decreases to a point at which the difference equals the difference in utility and cost at the basic benefits level.

For the competitive equilibrium to exist, the difference in payment rates in counties L and H must be less than or equal to the difference in M+COs' costs of providing $\theta^{\sim}$ benefits. The competitive equilibrium can exist when payment rates are disparate or similar, or when M+CO$_1$ has a small or large cost advantage over M+CO$_2$, as long as the difference in M+COs' costs is greater than or equal to the difference in payment rates. By Proposition 1 if a competitive equilibrium does not exist, welfare decreases. Figure 2-2 illustrates the competitive equilibrium.

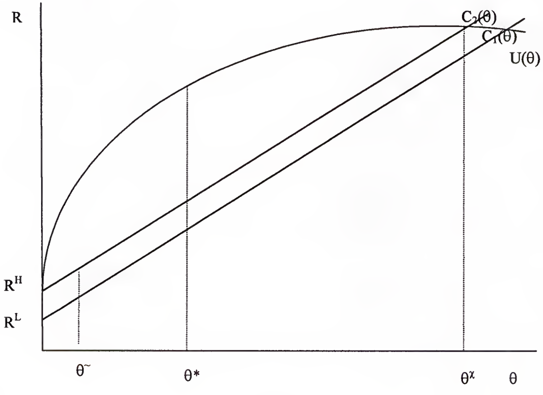

Figure 2-2
Characteristics of a Competitive Equilibrium

Corollaries 1, 2 and 3 indicate that imposing the UBR increases welfare in the competitive equilibrium characterized by $M+CO_1$ offering benefits sufficiently close to basic benefits, where the difference in M+COs' costs is sufficiently small and the difference in payment rates is also sufficiently small. Figure 2-2 helps to illustrate this conclusion. In equilibrium under the UBR, the difference between payment rates and costs must be sufficiently small, and the difference in M+COs' costs must also be sufficiently small.

2.4 Conclusion

This research shows that a uniform benefits requirement may cause M+COs to exit counties in which they would otherwise operate. Whenever M+COs exit a county due to the imposition of the UBR, welfare decreases. Conversely, the uniform benefits policy may increase welfare if the low cost M+COs continue to operate in those counties in which they operated prior to the imposition of the UBR. In this case, benefits in the lower payment counties are raised to the level of benefits in the higher payment counties. M+COs are more likely to remain in both counties under the uniform benefits requirement when the county and payment rates are characterized by payment rates in the high payment counties that make more generous benefits packages unprofitable, payment rates in low payment counties that accurately reflect M+COs' costs to provide benefits, and similar cost structures of competing M+COs.

Since payment rates are based on the average cost to provide benefits to enrollees within a specific county, if a M+CO has a large cost advantage over all other M+COs in the county, it may be able to profitably increase benefits in the low payment county and serve all enrollees in both counties.[20] However, this may actually be an oversupply of benefits.

When no M+CO has a significant cost advantage, each provides the highest profitable level of benefits possible. The incentive to exit a county and operate only in another county is small, since there is no cost advantage on which it can capitalize. No M+CO can earn extraordinary profits in any one county. It follows that this is most likely to be the case when payment rates are low. Low payment rates provide little incentive to offer more generous benefits packages. Keeping benefits as close to those required by Medicare law reduces competition and ensures all enrollees receive the same benefits without discrimination.

This policy appears to be appropriate, however more effective if it had been implemented in conjunction with an equivalent payment rate adjustment. If both the benefits and the payment rates had gradually been adjusted at complementary rates, perhaps provider exit could have been avoided. By requiring policy changes in benefits prior to amending payment rates, the government may have caused M+COs to temporarily exit the low payment counties leaving beneficiaries without providers and decreasing welfare. As payment rates become more similar within service areas, M+COs' incentives to exit counties should disappear. This research suggests the UBR may have caused M+COs to exit counties; however, the cause of such exit has yet to be proven. An empirical analysis to determine the actual effects of the UBR is needed.

---

[20] Beginning January 2000, the method of determining payment rates was reformed to include a partial adjustment based on beneficiary characteristics.

CHAPTER 3
AN EMPIRICAL ANALYSIS OF PROVIDER EXIT IN THE MEDICARE MANAGED CARE MARKET

3.1 Introduction

The Balanced Budget Act of 1997 (BBA) changed Medicare managed care in three important ways. First, it created the Medicare+Choice (M+C) Program. This program was designed to expand the Medicare managed care plan options available to eligible Medicare beneficiaries. Second, it instituted new payment rate calculations for determining the monthly payment to Medicare managed care organizations (M+COs) providing healthcare serves to Medicare beneficiaries. The new method incorporated average national health care costs with local health care costs in an effort to reduce payment rate disparities. Third, it instituted a uniform benefits requirement (UBR) that affected the benefits that M+COs were able to offer to their beneficiaries. The goal of the UBR was to discourage beneficiary discrimination by requiring M+COs to offer uniform premiums and benefits to all beneficiaries within their service area.

The main objectives of the BBA were to provide Medicare beneficiaries with increased private insurance choices offered by a greater number of providers (making Medicare beneficiaries' choices similar to those available to the non-Medicare population), and to decrease the disparity in payment rates that existed between adjacent counties. Encouraging overall growth in Medicare managed care in rural counties with traditionally low payment rates was of particular importance.

This chapter considers the effects of the BBA on Medicare managed care participation. First, it investigates whether Medicare managed care providers exited counties following the BBA. Second, it examines the causes of any observed exit. The analysis indicates that firms did exit. Between 1997 and 1999, the probability of a county losing a Medicare managed care plan was 194 percent higher than the probability of gaining a plan. In contrast, between 1993 and 1997 the probability of a county gaining a Medicare managed care plan was 54 percent higher than the probability of losing a plan.[1] In explaining this exit, neither changes in the manner in which payment rates are determined nor the creation of the Medicare+Choice Program are found to significantly affect provider participation. Instead, exit appears to be due at least in part to the uniform benefits requirement.

This study could have a significant impact on Medicare policy determination as the government looks for ways to control the rising cost of Medicare. The success of the Medicare managed care program could benefit the government, managed care providers, and beneficiaries: the government would benefit from decreased healthcare spending; managed care providers would acquire another source of profits; and beneficiaries could receive additional benefits such as prescription drugs or preventative healthcare. With knowledge of the sensitivity of Medicare managed care providers to administrative as well as financial changes, policies could be more carefully evaluated prior to being introduced to avoid adverse effects. This would enable HCFA to improve the success of their policies and to achieve their ultimate goal of affordable and comprehensive health care for the Medicare population.

---

[1] Details and discussion are provided in Section 3.4.

Because of the prevalent concern over current and future costs of providing Medicare, healthcare financing has received considerable attention from healthcare economists and others. In the early 1980s, Richard Foster addressed cost-based reimbursement and cost-shifting under cost-based reimbursement in the healthcare industry (see Foster, 1982 and 1985). More recently, Medicare and the BBA have been specifically addressed (see Victor Fuchs, 1999; Charles Kahn and Hans Kuttner, 1999; Bruce Vladeck, 1999; and Gail Wilensky and Joseph Newhouse, 1999). These papers focused on discussions of the weaknesses in the Medicare program and potential flaws within the BBA, and brought to the forefront again concerns about increasing costs. However, the specific effects of the BBA on Medicare managed care providers have not been addressed or empirically analyzed. The Medicare Payment Advisory Commission (MEDPAC) recognized the need for greater analysis. In the March 1999 report to Congress, MEDPAC indicated that it appeared plans were exiting, but did not identify the cause of this exit and in fact recommended not amending policy until further research could determine the cause of the perceived exit.

The United States General Accounting Office (GAO) has produced perhaps the most extensive research specifically addressing Medicare managed care. In a May 1997 report, "HMO Rates, Other Factors Create Uneven Availability of Benefits," the GAO analyzed the pre-BBA method of determining payment rates and recommended changes, some of which appear to have been incorporated into the BBA (see GAO/T-HEHS-97-133, 1997). Other GAO papers studied the reasons for beneficiary disenrollment, for provider exit, or for varying provider participation levels (see GAO/HEHS-97-37, 1997; GAO/HEHS-98-142, 1998; and GAO/T-HEHS-99-130, 1999). These papers provide summaries of the past and current status of Medicare managed care, as well as plan level information and extensive case studies. While the papers illustrate general trends and highlight important considerations, none provide an empirical analysis of the effects of the BBA on Medicare managed care.

Most research, both GAO and other, concentrates on the monthly payment rates that providers receive for enrolling Medicare beneficiaries. One particularly comprehensive paper by John Cawley, Michael Chernew and Catherine McLaughlin (2001, p. 3) reviews the methods used to determine payment rates and devises a new payment rate structure. They find that in 2000, only 17.1 percent of counties in the contiguous 48 states received a payment greater than necessary to support a HMO in the Medicare managed care market.

The effects of the BBA on Medicare managed care are not readily apparent from preliminary data analysis, which may partially explain the lack of research addressing effects other than those due to changes in payment rates. The literature does not consider administrative or legislative burdens that may result from policy changes. Such effects are difficult to quantify and equally difficult to uncover without a strong theoretical basis providing direction. This research uses theoretical insights to direct the focus of empirical analysis to regulations in the BBA that might cause M+COs to exit, and then relies on empirical evidence to analyze Medicare provider participation. By including administrative and legislative policy reforms, this research fills a void in the current Medicare managed care provider literature.

Through empirical analysis of the effects of the managed care reforms within the BBA, this chapter will highlight the importance of administrative policy changes as well as illustrate the effect of the change in the method of calculating payment rates. Most importantly, it will provide evidence of the effects of the BBA on Medicare managed care providers.

Chapter 3 is organized as follows. Section 3.2 provides information on the state of Medicare managed care. Section 3.3 explains the data and methods of analysis. Section 3.4 provides evidence of exit in the Medicare managed care market, and Section 3.5 provides empirical analysis and results. Section 3.6 is the conclusion.

3.2 Setting

Throughout the past decade, government and public concern over Medicare costs and accessibility to Medicare services have increased. The elderly population presently comprises approximately 13 percent of the total population. By 2030, the elderly population is expected to be 20 percent of the total population. Individuals aged 85 and older make up the fastest growing group of Medicare beneficiaries. This means that in addition to increasing demand for health care due simply to an increasing number of aged, there will be increases in chronic health conditions associated with aging that will boost Medicare expenses even further. The GAO predicts that an increasing population of seniors and rapid technology advancements will consume ever-growing shares of the nation's health care resources and federal budget (see GAO/T-HEHS-99-130, 1999, p. 2).

As the cost of providing health care has increased, participation in health insurance plans also has increased. Of the total 1997 United States population of 269.1 million, a significant majority (225.7 million, or approximately 84 percent) had some type of health insurance coverage (see Health Insurance Association of America, 1999, p. 11). During the 1990s, enrollment in private health insurance plans (i.e. managed care plans) increased dramatically. In 1993, 58 percent of employees were enrolled in managed care plans; by 1998, over 85 percent had enrolled in such plans.[2] Mirroring this increase in general managed care enrollment is Medicare managed care enrollment. According to the Health Care Financing Administration's (HCFA) Medicare data, while two million beneficiaries were enrolled in a Medicare health maintenance organization in 1990, 5.5 million were enrolled by 1997 (see Health Insurance Association of America, 1999, p. 58). These increases in enrollment substantiate the concern of many employers, insurers, and the government that methods must be found to reduce health care costs. Because managed care organizations are able to employ a variety of cost-control measures such as establishing preferred provider arrangements and utilizing risk management planning, preventative healthcare, and home healthcare, the government has increasingly tried to encourage private insurers to enter the Medicare managed care market.

While managed care plans generally benefit enrollees by increasing their health care options and absorbing a greater portion of the cost of treatment, this separation of beneficiaries from the direct costs of health care services hides the true cost of health care from individuals who may consequently use health care services excessively.[3] For these reasons, the cost of providing Medicare services to a growing number of individuals who are living longer is of great concern.

---

[2] Health Insurance Association of America (1999), page 58. Enrollment data are for managed care plans other than fee-for-service.

[3] Cost-sharing provisions do exist in most managed care plans but may not help control utilization because the vast majority of beneficiaries (87 percent) have some form of supplemental health care coverage such as Medigap that pays these costs; see GAO/T-HEHS-99-130, 1999, p. 3.

The growth of Medicare managed care marks a significant departure from the way Medicare was initially designed. Medicare was instituted in 1965 to provide health care services primarily to individuals over age 65 in order to help those individuals meet the potentially exorbitant healthcare costs incurred by the aged, especially since those individuals are typically no longer employed. Originally, Medicare provided this assistance through what is known as fee-for-service. For a fee, individuals entitled to receive benefits were permitted to obtain treatment from any hospital, doctor or specialist that accepted Medicare. In addition to original Medicare, employer-sponsored groups and private insurance companies began to contract with HCFA to be permitted to offer coverage to Medicare beneficiaries through managed care plans, for example through health maintenance organizations (HMOs) or preferred provider organizations (PPOs).

Prior to 1997, eligible Medicare beneficiaries could elect to receive Medicare benefits under the fee-for-service arrangement, or could choose among managed care plans classified as risk, cost, and healthcare prepayment (HCPP).[4] Risk plans encompassed the traditional HMO and PPO options. HCFA paid risk plans a per-enrollee, set monthly rate regardless of the services the plans provided to enrollees. These plans were required to cover physician services (known as Part B Medicare), and could also offer hospital insurance (known as Part A Medicare) if they desired. Under risk plans, enrollees generally paid a fixed monthly or annual premium, and were required to use doctors and hospitals contracted by the plan. Beneficiaries also generally paid a deductible and some form of co-insurance for services. Risk plans made up approximately 36 percent of the Medicare managed care market in 1993. This number doubled to 73 percent of the market by 1997.[5]

---

[4] See the Glossary for plan definitions and for definitions of other terms used throughout this chapter.

Cost plans were required to offer beneficiaries Part A coverage and Part B coverage, however enrollees were permitted to obtain services from doctors outside of the plan. HCFA paid cost plans on the fee-for-service schedule, per service, for in-patient hospital stays, and the per-enrollee set monthly payment for doctors' services. Cost plans made up approximately 11 percent of the Medicare managed care market in 1993 and approximately 8 percent by 1997.

The third option, HCPPs, were generally employer sponsored health services or in-company healthcare. These plans did not offer Part A coverage. HCFA paid HCPP plans the set monthly rate for Part B coverage for their enrollees. HCPP plans comprised approximately 52 percent of the Medicare managed care market in 1993, but only approximately 19 percent by 1997.

According to the Department of Health and Human Services, "the introduction of the Medicare+Choice Program represents what is arguably the most significant change in the Medicare program since its inception."[6] This program effectively changed the entire structure of the Medicare program through its reformation of payment rates, benefits and requirements. The effects of these changes will be analyzed in the remainder of this chapter.

---

[5] See Table 3.7 for details.

[6] Federal Register, Department of Health and Human Services, 42 CFR Part 400 (1998), page 34968.

3.3 Data and Methods

A cursory look at the data on Medicare managed care provider participation shows little evidence of the massive provider exit reported by media and government sources following the BBA.[7] In fact, the data reveal a slight increase in the number of plans per county following the BBA in those counties with one or two plans initially. Additionally, preliminary empirical work finds no statistical evidence of increased provider exit. A more detailed look however reveals the trends that were thought to exist. The fact that provider exit was obscured in preliminary analysis is due to the large number of counties without any managed care plans. In 1997, almost sixty percent of counties in the U.S. (1870 out of 3135 counties total) did not have a plan. The large number of counties incapable of losing a plan sufficiently obscured the entry and exit patterns of those counties that did have plans and were therefore more likely to be affected by the BBA. To analyze the real effect of the BBA on Medicare managed care providers, it was necessary to segment the data into various categories to gain a more accurate picture of provider entry and exit.

One way to determine whether the BBA had an impact on the number of plans per county (and if this impact differed across counties) is to estimate what the number of plans per county would have been in 1999 if the BBA had not been passed, and compare that to the actual number of plans per county in 1999. Alternatively, because data are available for years prior to the BBA, these years can serve as a benchmark. For example, if the change in the number of plans per county from 1993 to 1995 to 1997 was consistent, and then in 1999 a great difference occurred, this would suggest the BBA did have an impact. We could further see if this impact was found to be greater in urban or in rural counties, or in counties with a greater number of competitors versus counties with one or two competitors. This method of difference-in-difference analysis is used to compare the changes in average number of plans per county before the BBA to the changes in the average number of plans per county after the BBA. The differences in these changes provide the impetus for proceeding to formal regression analysis that is the primary focus of this chapter. The regression analysis specifies those components of the BBA that had the greatest impact on observed changes in provider participation rates.

---

[7] For example, see New York Times article "Clinton Plans to Intervene as HMOs Exit Medicare," October 8, 1998.

Initial analysis found that plan participation declined following the BBA. The hypothesis is that the causes of the decline are a result of three major changes instituted in the BBA: the M+C Program, changes in the method of calculating payment rates, and the UBR. The data allow the first two effects to be measured directly. These effects do not prove to be significant in causing provider exit. Consequently, the observed exit must be due to the third effect. Additional evidence exists to support this theory, however it is also possible that some factor(s) not accounted for in the model either contributed to or were the primary cause of provider exit. The BBA's vast administrative changes in particular may have been sufficient to have caused some of the observed exit.[8]

To determine the relevant factors to include in the empirical study, I reviewed HCFA policies, the Balanced Budget Act, General Accounting Office reports to Congress, and other related research for information on the Medicare+Choice Program.

---

[8] A New York Times article reported "HMO's pulling out of Medicare said that... new Federal regulations (were) more burdensome than expected, pushing compliance costs higher." October 8, 1998.

To identify counties with plans, I used HCFA's Medicare Managed Care Market Penetration files. HCFA's files include quarterly data on Medicare plans, beneficiaries and payment rates by county from 1993 through 1999. I used fourth quarter data for each sample year: 1993, 1995, 1997 and 1999. All types of plans (cost, demonstration, HCPP and risk) are included in the data set. Observations exist for each plan by county for those plans with at least one percent of the market; each observation includes the number of enrollees and type of plan.[9]

I excluded Guam, Puerto Rico and the Virgin Islands from the analysis. All U.S. counties are included with the exception of eight areas.[10] In total, the sample includes 3135 counties in each of four years. I used HCFA's classification of large urban areas as listed in HCFA's Metropolitan Statistical Area files and the Metropolitan Statistical Area classifications from this same file.

County level payment rate information for 1993 to 1999 Medicare managed care plans is also from HCFA's database. The rates are available for Part A and Part B separately, and do not include any risk adjustment factors (such factors would be used by providers for auditing particular beneficiaries' rates, but in the absence of beneficiary/plan data, such factors could not be incorporated).

---

[9] Original data include information based on enrollees' county of residence, which may differ from the county in which the plan is contracted to operate. This results in enrollees listed in counties in which a plan does not exist. To correct for this, I used the December 1993 and December 1999 Market Penetration files and deleted all plan/county combinations where a plan enrolled fewer than ten enrollees. Because actual plan information was not available on plan service areas before 1997, this provided an approximation of plans' actual county participation. To crosscheck my changes to the data, I deleted plans with less than 1% of the market share (as determined by a plan's enrollees divided by the total number of eligible beneficiaries). This produced the same result as eliminating plan/county combinations with fewer than 10 enrollees, and reduced the number of inaccurate observations (as confirmed by HCFA Medicare Compare files). It also eliminated observations in which a plan was licensed but not operating.

[10] Excluded county codes include those for: Denali, AK; Skagway-Hoonah-Angoon, AK; Yakutat, AK; (not proper counties therefore incomplete data); Yellowstone National Park, MT (insufficient data); Fairfax City, VA; Franklin City, VA, Bedford City, VA; and Roanoke City, VA.(independent cities of VA were not included; the counties in which these cities are located were included).

Population data are taken from the Inter-University Consortium for Political and Social Research (ICPSR), and is originally from the 1990 US Census of Population and Housing. Per Capita Income data are from the University of Virginia Library's Geostat (Geographical and Statistical Data Center), and land area is from the University of Michigan's On-Line Statistical Resources. Throughout this research, the unit of observation is the county. The BBA instituted payment rate changes at the county level, and all other BBA requirements are effective at the county level or the service area level, the smallest unit of which is a county.[11]

3.4 Evidence of Exit in the Medicare Managed Care Market

A summary of total participation in all counties in all years is presented in Table 3.1. From 1993 to 1997, the percentage of counties with no plans fell consistently. Accordingly, the percentage of counties with a positive number of plans increased from 1993 to 1997 regardless of the number of plans per county. In 1999, however, this trend changed. The percentage of counties without a plan is slightly greater in 1999 than in 1997. While the percentage of counties with one or two plans increased slightly, the percentage of counties with three or more plans decreased. This belies reports of providers exiting counties and in doing so, leaving beneficiaries with no managed care options. However, the data suggest a slowdown in entry and expansion of managed care plans.

---

[11] The county is no longer the smallest area by which a M+CO can determine its service area. M+COs are permitted to offer plans by zip code rather than by county. However, they were not permitted to do so before 2000.

Table 3.1
Percentage of Counties with the Indicated Number of Managed Care Plans, by Year

year plans[a]	1993	1995	1997	1999
0	79.69	74.81	65.11	65.56
1	15.37	16.65	18.59	19.01
2	2.77	4.11	7.24	7.30
3	1.21	2.30	4.05	3.76
4+	0.96	2.14	5.01	4.37

a. Sample size is 3135 observations per year.

The simplest indication that overall exit rates increased after the BBA comes from examining a probability matrix. Table 3.2 presents a matrix of the probability of gaining or losing a plan, and of having no change in the number of plans per county over a two year span. For example, in the case where the number of plans per county in the initial year is one, from 1993 to 1995 the probability of gaining a plan is 18 percent. From 1995 to 1997 the probability of gaining a plan is 29 percent. However, from 1997 to 1999, the probability of gaining a plan is less, at 13 percent. The next panel shows the probability of losing a plan from 1993 to 1995 and from 1995 to 1997 is 5 percent for counties with one plan in the initial year; from 1997 to 1999, this probability is much higher at 24 percent. In fact, for all years 1993 to 1997, the probability of losing a plan decreases or remains the same for all categories except when the number of plans in the initial year is four. The table shows that from 1997 to 1999, the probability of losing a plan, regardless of the initial number of plans, is much higher (200 percent higher) than the probability of gaining a plan. This is the opposite of the trend from 1993 to 1995 and from 1995 to1997 when the probability of gaining a plan was consistently greater than or equal to the probability of losing a plan (on average, 54 percent higher).

Table 3.2
Matrix of the Probabilities of a Change in the Number of Plans Per County
Over the Relevant Years, Given the Initial Number of Plans Per County, for All Counties

	Probability of Gaining a Plan			Probability of Losing a Plan			Probability of Same Number of Plans		
Number Plans Initial Year[b]	1993-1995	1995-1997	1997-1999	1993-1995	1995-1997	1997-1999	1993-1995	1995-1997	1997-1999
0	0.07	0.14	0.08	0.00	0.00	0.00	0.93	0.86	0.92
1	0.18	0.29	0.13	0.05	0.05	0.24	0.78	0.66	0.63
2	0.36	0.44	0.18	0.07	0.03	0.39	0.58	0.53	0.44
3	0.58	0.56	0.18	0.08	0.08	0.47	0.34	0.38	0.35
4	0.63	0.44	0.14	0.13	0.15	0.47	0.25	0.42	0.40
5+	0.14	0.15	0.14	0.73	0.15	0.52	0.14	0.69	0.34
Average	0.33	0.34	0.14	0.21	0.09	0.42	0.50	0.59	0.51

b. Sample size is 3135 observations for each span of years.

To gain a greater understanding of the factors affecting providers' participation decisions, it is helpful to look at those counties that maintained the same number of plans between 1997 and 1999. For counties with no change in the number of plans between 1997 and 1999, the pattern of participation closely reflects expected market influences (managed care providers with a large percentage of non-Medicare enrollees are expected to be most greatly influenced by market forces). The number of plans per county increases as average payment rates rise and as the population of elderly per square mile increases. Counties with a greater number of plans were increasingly urban counties with higher per capita income, presumably counties in which managed care providers could enroll the greatest number of beneficiaries and earn the greatest profit. This information is presented in Table 3.3 below.

Table 3.3
Analysis of Counties with Zero Net Change in
Total Number of Plans Per County from 1997 to 1999

Plans per County	0	1	2	3	4	5	6	8
Number of Observations	1870	367	99	44	34	19	3	2
Averages:								
Part A Payment Rate 1997	248.34	260.84	285.76	310.41	316.19	340.95	362.86	377.14
Part B Payment Rate 1997	126.91	135.63	146.32	159.73	157.87	170.58	188.37	322.16
Part A Payment Rate 1999	236.50	245.12	261.36	281.18	287.27	306.42	329.02	417.40
Part B Payment Rate 1999	175.74	182.14	194.21	208.94	213.46	227.69	244.48	310.15
Part A Percentage increase 1997 to 1999	-2.61	-4.33	-7.57	-9.09	-7.76	-9.22	-9.50	10.56
Part B Percentage increase 1997 to 1999	38.48	34.29	32.73	30.81	35.21	33.48	29.79	-3.73
Part A Increase over Nat'l Avg. 1997	-1.21	3.77	13.69	23.49	25.79	35.64	44.36	50.04
Part B Increase over Nat'l Avg. 1997	-5.63	1.16	8.38	16.07	15.08	21.41	28.83	58.39
Part A Increase over Nat'l Avg. 1999	-0.71	2.92	9.74	18.06	20.62	28.65	38.14	75.25
Part B Increase over Nat'l Avg. 1999	-3.72	-0.07	6.15	12.76	14.61	19.95	25.45	41.23
Population Aged 60 and Over	4,945.46	8,164.33	28,537.67	60,859.68	38,300.47	91,546.16	495,989.70	347,838.00
Population Aged 60 and Over / mile	11.21	16.62	70.70	178.35	119.94	270.05	317.60	229.84
Per Capita Income	14,659.91	14,752.76	16,968.64	19,293.68	18,115.71	19,138.79	20,057.67	20,089.00

To more precisely identify changes in participation within counties, it is helpful to consider the subset of counties in which providers offered a plan in 1993 and to exclude counties in which no plan had been offered.[12] In each sample year, the majority of counties had no managed care plans, and in fact 58.9 percent (1863 counties in total) did not have a plan in any of the four sample years. Only 5.9% (186 counties in total) had a plan in all years except one. Entry and exit, when they occurred, did so in no more than 40 percent of all counties across the sample years.

Table 3.4 illustrates the average change in number of plans per county for an urban county versus a non-urban county, and highlights the effect of considering only those counties in which a plan was offered in 1993. When all counties are included in the analysis, the average change in number of plans from 1997 to 1999 is negative for both urban and non-urban counties, indicating fewer plans in 1999 than in 1997.[13] Conversely, the average change in number of plans from 1995 to 1997 is positive, as is the average change in number of plans from 1993 to 1995. The difference in sign alone suggests a significant change in the number of plans per county after the BBA, and difference-in-difference analysis confirms that the average change in the number of plans per county from 1997 to 1999 is significantly different from the average change in the number of plans per county from 1995 to 1997. This result applies regardless of counties' urban classification. This table also shows, however, that the average change in number of plans per county from 1993 to 1995 is significantly different from the average change in number of plans per county from 1995 to 1997, a result not easily apparent from simply looking at the positive means. The fact that all the averages from the initial year to the subsequent year (i.e. 1997 to 1999, 1995 to 1997, and 1993 to 1995) are significantly different means that a conclusion about the change from 1997 to 1999 cannot be made with respect to the effect of the BBA.

---

[12] 1993 is chosen as the base year as it is the first year of sample data.

[13] The mean is the average of the change in number of plans in 1999 minus the change in plans in 1997 for each county.

Table 3.4
Comparison of the Average Change in Number of Plans Per County
Over the Relevant Years, Segregated by Urban Classification

All Counties

	Mean Change in Plans 1999-1997	Mean Change in Plans 1997-1995	Diff-in-Diff[d] (1999-1997) - (1997-1995) [standard error]	Mean Change in Plans 1995-1993	Diff-in-Diff (1997-1995) - (1995-1993) [standard error]	DDD[e] partialing out county trends
All Counties	-0.032	0.270	-0.302*** (0.017)	0.106	0.165*** (0.018)	-0.467*** (0.031)
Urban[c] Counties	-0.033	1.023	-1.060*** (0.041)	0.364	0.663*** (0.120)	-1.722*** (0.178)
Non-Urban Counties	-0.032	0.180	-0.212*** (0.015)	0.075	0.105*** (0.012)	-0.317*** (0.026)

Counties with one or more plans in 1993.

	Mean Change in Plans 1999-1997	Mean Change in Plans 1997-1995	Diff-in-Diff (1999-1997) - (1997-1995) [standard error]	Mean Change in Plans 1995-1993	Diff-in-Diff (1997-1995) - (1995-1993) [standard error]	DDD partialing out county trends
All Counties	-0.201	0.376	-0.577*** (0.048)	0.168	0.208*** (0.064)	-0.785*** (0.094)
Urban Counties	-0.145	0.836	-0.980*** (0.128)	0.263	0.572* (0.228)	-1.553*** (0.293)
Non-Urban Counties	-0.219	0.231	-0.450*** (0.047)	0.138	0.093 (0.041)	-0.543*** (0.081)

*** = significant at .001

** - significant at .005

* = significant at .01

c. Based on 1993 urban classification of counties, which includes all counties classified as urban throughout the sample years. There were a total of 307 urban counties. In counties with one or more plans in 1993, 149 of 636 counties were classified as urban. Sample size is 12,540 for all counties, 2544 for counties with one or more plans in 1993.

d. Diff-in-Diff is the difference between the Mean Change in Plans 1999-1997 and the Mean Change in Plans 1997-1995.

e. DDD is the difference between the "Diff-in-Diff (1999-1997)-(1997-1995)" and the "Diff-in-Diff (1997-1995)-(1995-1993)".

However, when the data set is restricted to counties having at least one plan in 1993, the average change in the number of plans per county between 1997 and 1999 does suggest the BBA may have had an effect. The difference in the average change in the number of plans per county between 1997 and 1999 and the average change in the number of plans per county between 1995 and 1997 is still significant regardless of urban classification. But the average change in the number of plans per county between 1995 and 1997 is not significantly different from the average change in the number of plans per county between 1993 and 1995 in non-urban counties, and the difference has a lower level of statistical significance (.01 level) considering only urban counties. The significance of these differences suggests that the BBA did cause providers to exit.

A similar conclusion may be drawn from Table 3.5, which provides results of the difference-in-difference analysis for counties based on the number of plans in the initial year considered, and whether those counties gained or lost plans. The average change in the number of plans per county from 1997 to 1999 is consistently negative for all counties with at least one plan. The average change in the number of plans per county from 1995 to 1997 is consistently positive. This difference is significant for counties with three or fewer plans in 1993 (only eight counties had four plans in 1993, and a total of twenty-one counties had five or more plans in 1993). In contrast, significant differences between the 1993-1995 span and the 1995-1997 span occurred only in counties without any plans in 1993. These differences are statistically significant in the majority of cases and apply regardless of how the data are segmented (additional difference-in-difference tables are presented in Appendix B).

Table 3.5
Comparison of the Average Change in Number of Plans Per County
Over the Relevant Years, Categorized by the Number of Plans Per County in 1993

	Mean Change in Plans 1999-1997	Mean Change in Plans 1997-1995	Diff-in-Diff (1999-1997)-(1997-1995)	Mean Change in Plans 1995-1993	Diff-in-Diff (1997-1995)-(1995-1993)	DDD Partialing Out County Trends
All Counties (12540 obs.)	-0.032	0.270	-0.302*** (0.017)	0.106	0.165*** (0.018)	-0.467*** (0.031)
Counties with 0 plans in 1993 (9996 obs.)	0.011	0.243	-0.232*** (0.015)	0.090	0.154*** (0.015)	-0.386*** (0.028)
Counties with 1 plan in 1993 (1928 obs.)	-0.137	0.332	-0.469*** (0.050)	0.220	0.112 (0.050)	-0.581*** (0.090)
Counties with 2 plans in 1993 (348 obs.)	-0.575	0.655	-1.230*** (0.138)	0.379	0.276 (0.138)	-1.506*** (0.256)
Counties with 3 plans in 1993 (152 obs.)	-0.211	0.526	-0.737*** (0.235)	0.684	-0.158 (0.235)	-0.579 (0.433)
Counties with 4 plans in 1993 (32 obs.)	-0.375	0.000	-0.375 (0.405)	0.625	-0.625 (.405)	0.250 (0.776)
Counties with 5 + plans in 1993 (86 obs.)	-0.048	0.095	-0.143 (1.102)	-3.000	3.095** (1.012)	-3.238 (1.784)
Counties with plan(s) in 1993 and no plans in 1995 (92 obs.)	-0.087	0.391	-0.478*** (0.132)	-1.000	1.391*** (0.132)	-1.870*** (0.263)
Counties with plans in 1995 that either gained or lost a plan since 1993 (1392 obs.)	-0.468	0.707	-1.175*** (0.103)	1.017	-0.310** (0.103)	-0.865*** (0.185)
Counties that gained a plan from 1993 to 1995 (1292 obs.)	-0.492	0.734	-1.226*** (0.075)	1.337	-0.604*** (0.075)	-2.980*** (-0.766)

*** = significant at .001
** = significant at .005
* = significant at .01

Segmenting the data based on population, reimbursement payment rates, per capita income, and urban classification provides equivalent results (additional tables are presented in Appendix B). Among counties with plans in 1993, the change in average number of plans from 1997 to 1999 is significantly different from the change in the average number of plans from 1995 to 1997. However, the change in the average number of plans from 1993 to 1995 is not significantly different from the change in the average number of plans from 1995 to 1997. The degree of difference is significant at the .001 level in the vast majority of cases. Overall, the data suggest a slight increase in the average number of plans per county from 1993 to 1995 and a larger increase from 1995 to 1997, followed by a decrease in the number of plans in 1999, and this decrease is almost always statistically significant at the .001 level. Tables outlining these results clearly suggest a change in participation among providers following the BBA. This result is important because it supports the hypothesis that between 1997 and 1999 provider participation decisions were significantly different from those decisions in prior years. In each case, the average change in number of plans per county from 1997 to 1999 is negative (i.e. exit) while in all other cases 1993 to 1995 and 1995 to 1997, the average change in number of plans per county is positive (i.e. entry). The data provide evidence that exit did occur after 1997 and that the exit was significantly greater than in prior years. Given evidence of exit, next, the cause of this exit must be determined.

3.5 Empirical Analysis of the Causes of Provider Exit

A difference-in-difference empirical approach is used to begin the analysis. The difference-in-difference method combines two different degrees of variation so that factors correlated with each degree of variation individually can be differenced away.

Assuming there were no disturbances other than the passing of the BBA (or that any other disturbances would not affect Medicare provider participation decisions), the difference-in-difference estimates identify the policy effect of the BBA. For example, this research considers the increase or decrease in the number of Medicare managed care plans per county over the years prior to the BBA, versus the increase or decrease in plans per county in the years after the BBA was passed. If the change in the number of plans per county from 1993 to 1995 was roughly the same as between 1995 and 1997, but the corresponding change between 1997 and 1999 was much greater, this would suggest the BBA did have an impact.

The difference-in-difference approach is more precisely explained as follows. Define DD as the difference-in-differences in the average number of Medicare managed care plans per county between 1995 and 1997, and 1997 and 1999, i.e., DD = (Plans_{99} - Plans_{97}) - (Plans_{97} - Plans_{95}). DD is measured by subtracting the change in the average number of plans per county over the two years before the BBA from the change in the average number of plans per county over the two years after the BBA. A positive sign indicates that the number of plans per county increased more (or decreased less) between 1997 and 1999 than the average number of plans per county from 1995 to 1997. Similar analysis was done to include 1993 and 1995 data. Difference-in-difference analysis indicates whether the relative differences in changes in the average number of plans per county is statistically significant.

A difference-in-difference analysis that indicates a significant change in the number of plans per county following the BBA suggests that the BBA is associated with provider exit. If there were no other stimulus to provider participation, the changes in participation would not be significantly different across years. Any dramatic increase or decrease in participation must be attributable to a policy or event. Controlling for extraneous influences through differencing suggests that any significant exit effects may be due to the BBA. Additional analysis is needed to determine the cause of the exit. The regression analysis specifies those components of the BBA that had the greatest impact on observed changes in the number of plans per county, and therefore is used to determine the cause of the observed exit.

The regression analysis uses panel data to examine first the effects of the BBA on the number of Medicare managed care plans per county, and second the effects of the BBA on the change in the number of Medicare managed care plans per county. The first analysis uses a linear fixed effects regression model.

The basic model is given by $N_{it} = f(BBA_{it}, P_{it}, R_{it}, S_{it}, X_{it})$ (1)

where:

N, the number of plans per county, is the dependent variable;

BBA is a dummy variable indicating if the policy is in effect (BBA = 1) or not in effect (BBA = 0);

P is a vector of dummy variables that indicate the type of plan: cost, demonstration, HCPP, risk, or M+C;

R is a vector of Medicare payment rates: Part A Aged and Part B Aged;

S is a vector of dummy variables that control for any state effects;

X is a vector of the remaining explanatory variables including elderly population per mile, per capital income, and urban classification;

i indexes the county;

t indexes the year (1993, 1995, 1997, or 1999).

The second analysis estimates the change in the number of plans per county over a two year span. The basic model is given by $\Delta N_{it} = f(Y_i, P_{it}, \Delta R_{it}, \Delta X_{it})$ (2)

where:

Δ denotes the change in a variable used in the fixed effects regression, but the notation is otherwise identical to that employed in equation (1);

Y is a vector of three dummy variables indicating the span of years considered: Y97 = 1 if the change in the number of plans is measured between 1997 and 1999, Y97 = 0 otherwise; Y75 = 1 if the change in the number of plans is measured between 1995 and 1997, Y75 = 0 otherwise; Y53 = 1 if the change in the number of plans is measured between 1993 and 1995, Y53 = 0 otherwise;

P is a vector of dummy variables that indicate the change in plan type from 1997 to 1999, P = 1 if the plan type changes after 1997, P = 0 otherwise;[14]

i indexes the county;

t indexes the span of years (1993-1995, 1995-1997, or 1997-1999).

Summary statistics for the explanatory variables are provided in Table 1.

The hypothesis is that three primary factors combined to cause the decrease in participation of Medicare managed care providers: the Medicare+Choice Program, changes in the method of calculating payment rates, and the uniform benefits requirement. Analysis using the variables summarized in Table 1 will clarify the role of each of the factors in the exit of Medicare managed care providers.

---

[14] Regression analysis indicates that exit rates differed by plan type, however no plan type significantly affected the change in the number of plans per county. Therefore, the change in plan type includes changes incurred by all plans in the relevant year.

Table 3.6
Summary Statistics for Regression Models

Variable Description	Name	Obs	Mean	Std. Dev.	Min.	Max.
Total number of plans in the designated county in the relevant year	NumPlan	12540	0.52	1.10	0.00	30.00
Total number of plans in the designated county in 1993	NumPlan3	12540	0.31	0.98	0.00	30.00
Total number of plans in the designated county in 1995	NumPlan5	12540	0.42	0.92	0.00	8.00
Total number of plans in the designated county in 1997	NumPlan7	12540	0.69	1.23	0.00	8.00
Total number of plans in the designated county in 1999	NumPlan9	12540	0.65	1.18	0.00	8.00
Medicare Part A Aged county-wide payment rate, by year	PartAAge	12536	227.95	51.64	89.30	541.48
Medicare Part B Aged county-wide payment rate, by year	PartBAge	12536	136.44	37.02	30.64	363.15
Combined Medicare Part A Aged and Part B Aged payment rate, by county, by year.	PartsAB	12536	364.39	81.35	168.15	798.35
1990 population of persons aged 60 and over per county	Pop	12540	13475.94	40933.13	18.00	1175815.00
1990 population of persons aged 60 and over, per square mile, per county	PopMile	12540	37.97	248.20	0.00	9387.43
Indicator variable for existence of BBA policy, by county	Policy	12540	0.25	0.43	0.00	1.00
Indicator variable for county classified as urban in the relevant year.	Urban[f]	12540	0.10	0.30	0.00	1.00
County wage index by year as determined by HCFA	WI	9393	7961.38	934.35	0.00	14288.00
Per Capita Personal Income in 1990, by county	PerCapIn	12540	15261.20	3544.46	5559.00	38794.00
Indicator variable for existence of cost plan in the relevant county in the relevant year.	Cost	12540	0.05	0.01	0.00	1.00
Indicator variable for existence of demonstration plan in the relevant county in the relevant year.	Demo	12540	0.01	0.11	0.00	1.00
Indicator variable for existence of HCPP plan in the relevant county in the relevant year.	HCPP	12540	0.12	0.32	0.00	1.00
Indicator variable for existence of risk plan in the relevant county in the relevant year.	Risk	12540	0.16	0.37	0.00	1.00
Indicator variable for existence of a Medicare managed care plan in the relevant county in the relevant year	PlanYorN	12540	0.29	0.45	0.00	1.00

f. More counties were classified as urban in 1993 than in any of the subsequent years.

Table 3.6--continued

Variable Description	Name	Obs	Mean	Std. Dev.	Min.	Max.
Indicator variable for the region of the US the county is in.		12540			1.00	9.00
Total number of Medicare eligible beneficiaries per county, by year	Bene	12540	1390.00	8194.42	0.00	260264.00
Indicator variable for existence of a cost plan in the relevant county after the BBA.	polcost	37620	0.02	0.15	0.00	1.00
Indicator variable for existence of a demonstration plan in the relevant county after the BBA.	poldemo	37620	0.01	0.10	0.00	1.00
Indicator variable for existence of a HCPP plan in the relevant county after the BBA.	polHCPP	37620	0.02	0.15	0.00	1.00
Indicator variable for existence of a risk plan in the relevant county after the BBA.	polrisk	37620	0.08	0.27	0.00	1.00
Change in the number of plans per county over the relevant span of years.	dp	21941	0.11	0.68	-0.24	5.00
Difference in the number of plans per county: 1995 - 1993	db53	7322	0.11	0.66	-24.00	4.00
Difference in the number of plans per county: 1997 - 1995	db75	7170	0.27	0.70	-1.00	5.00
Difference in the number of plans per county: 1999 - 1997	db97	7449	-0.03	0.65	-5.00	4.00
Change in the Medicare Part A payment rate over the relevant span of years	PartAChg	18802	18.41	34.37	-131.70	180.64
Change in the Medicare Part B payment rate over the relevant span of years	PartBChg	18802	23.34	21.23	-86.05	157.59
Change in the Combined Medicare Part A and Part B payment rates over the relevant span of years	ABChg	18802	41.75	29.08	-88.19	203.82
Change in the number of eligible Medicare beneficiaries over the relevant span of years	eligchg	10131	0.03	0.16	-9.57	0.99
Change in the urban classification of counties over the relevant span of years	urbanchg	18806	0.00	0.12	-1.00	1.00
Change in the wage index per county over the relevant span of years	WIchg	12514	0.00	0.03	-0.65	0.24
Indicator variable for span of years 1993 t 1995, by county	Y53	21941	0.33	0.47	0.00	1.00
Indicator variable for span of years 1995 t 1997, by county	Y75	21941	0.33	0.47	0.00	1.00
Indicator variable for span of years 1997 t 1999, by county	Y97	21941	0.34	0.47	0.00	1.00

3.5.1 Medicare+Choice Program

The M+C Program was designed to offer a wider range of healthcare choices for Medicare beneficiaries. Among the alternatives available were the traditional managed care plans mentioned above (now called M+C coordinated care plans), M+C medical savings account plans (which combine a M+C plan with a contribution to a medical savings account) and M+C fee-for-service plans.[15] This research examines only the M+C coordinated care plans (or M+C plans) as these plans represent the greatest number of beneficiaries and are expected to have the greatest impact on Medicare managed care. With the institution of the Medicare+Choice Program, cost, HCPP and risk plans were to be phased out. The BBA introduced requirements for transitioning these existing plans to M+C plans. Beginning in January 1998, M+C plans could be offered. M+C plans were required to offer Part A and Part B coverage, and were to be reimbursed on a monthly basis for each enrollee as dictated by the new payment rate policy. Risk plans were eliminated after 12/31/98; HCPP plans were eliminated as of 12/31/98 for entities eligible to participate as M+COs, and cost plans were not permitted to expand membership and were to be eliminated by 12/31/02 (see Appendix B.1 for details). By 1999, 73 percent of all managed care plans were M+C plans, approximately 12 percent were cost plans, and approximately 10 percent were HCPP plans.[16]

The mandated changes could affect participation for multiple reasons. First, the BBA instituted a five-year contracting prohibition. HCFA prohibited participation for five years of any provider that had exited a county; only special circumstances could override this regulation. Plans that were uncertain of profitability of the M+C Program may have elected to exit immediately to avoid the exclusion, then evaluate the market and re-enter if circumstances proved favorable. Second, plans not wishing to join the M+C program would be forced to exit, either immediately or by the end of 2002 at the latest. Third, plans unable to absorb the cost of transitioning would also exit. For plans making this participation decision, additional costs had to be considered. Extra costs would be incurred by plans offering only Part B coverage or portions of Part B coverage that now must offer full Part A and Part B coverage.[17] There would also be additional administrative costs: the costs of finding hospitals and doctors willing to accept the plan and negotiating agreements with them, the costs involved in notifying beneficiaries of the changes, and the accounting costs of determining whether the new payment rates would be sufficient to cover the new services that must be offered.

---

[15] Under the Medical Savings Account option, beneficiaries obtain high deductible health policies that pay for at least all Medicare-covered services after an enrollee meets the annual deductible of up to $6,000. The difference between the premiums for such high deductible policies and the applicable M+C premium amount is placed into an account for the beneficiary to use in meeting his deductible expenses.

[16] Remaining plans (5 percent) were demonstration plans, for which no formal classification applies.

Participation decisions and cost evaluations were undertaken regularly even before the BBA; Medicare managed care participation had not been stagnant. In the four years prior to the BBA, the percentage of each type of plan had shifted. As shown in Table 3.7, the number of risk plans had steadily increased from 1993 to 1997. This reflects the general increase in managed care providers.

HCPP plans had been decreasing in number and as a percentage of all plans from 1993 on. This appears to be due to a general decrease in employer sponsored retirement health plans. For example, United Mine Workers offered plans in 149 counties in 1993,

---

[17] Risk and cost plans that converted to M+C plans were permitted to offer only Part B coverage to those beneficiaries previously enrolled to receive Part B coverage, under HCFA guidelines. Part A and Part B were required for new enrollees to the plan.

Table 3.7
Total Number of Medicare Managed Care Plans and Percentage Market Share of Each Type of Plan, for Each Sample Year

	1993	%	1995	%	1997	%	1999	%
Cost	106	10.91%	115	8.81%	169	7.86%	243	11.84%
Demo	9	0.93%	6	0.46%	29	1.35%	106	5.16%
HCPP	505	51.95%	474	36.32%	413	19.21%	211	10.28%
Risk / M+C[g]	352	36.21%	710	54.41%	1539	71.58%	1493	72.72%
Total Number of Observations	972	100.00%	1305	100.00%	2150	100.00%	2053	100.00%

g. The risk / M+C plan type refers to risk plans in 1993, 1995 and 1997, and to M+C plans in 1999.

but by 1997 this number had decreased to 134. Fewer retired miners resulted in fewer health care plans for miners. Those HCPP plans eligible to participate as a M+CO could elect to do so, or if the organization was unable to convert to a M+C or to meet the new definition for HCPPs, it could convert to a cost plan. This requirement is reflected in the significant decrease in absolute number of HCPP plans between 1997 and 1999. From 1993 to 1995, HCPP plans decreased approximately 6 percent, and approximately 13 percent from 1995 to 1997; however, from 1997 to 1999, they decreased approximately 49 percent.

Cost plans were permitted a longer time before being eliminated, but effects of the BBA are reflected in their numbers. From 1993 to 1997, the absolute number of cost plans increased, however consistently decreased as a percentage of total plans. Between 1997 and 1999, the absolute number of plans continued to increase, but they also gained a greater percentage of the market. Although cost plans were still permitted to exist, HCFA did not permit any new cost plans or service area expansions as of August 1997. Therefore, all increases in cost plans were due to the transition of HCPPs to cost plans.

Table 3.8 provides information on the distribution of types of plans. The number of counties with multiple plans increased from 1993 to 1997, followed by a slight decrease in 1999. This implies an increasing number of providers in counties with plans from 1993 to 1997, i.e., greater competition. Additionally, approximately half (47 percent) of these counties had more than one type of plan, for example a risk contract and a cost contract. Since HCFA prohibits Medicare providers from having concurrent risk and cost contracts in the same service area (to avoid risk selection[18]), these plans do reflect greater numbers of providers and therefore greater competition in the affected counties. While the number of counties with multiple plans decreased following the BBA, the number of counties with multiple types of plans did not. This indicates that competition may have forced some providers to exit counties with plans, but that demand for alternate plan types allowed different plan types to remain. The increase in the number of multiple types of plans per county suggests that providers made their participation decisions based on enrolling a particular type of beneficiary. The majority of counties had risk contracts in addition to another type of plan. This indicates that the Medicare managed care market within larger urban counties supported multiple plan types because they catered to different consumers, i.e., risk and HCPP plans are not substitutes.

Since cost and HCPP plans were to be eliminated if they could convert, and that there were still the same number of different types of plans after the BBA, it appears most cost and HCPP plans remained in counties with less direct competition.

---

[18] If HCFA allowed concurrent risk and cost plans, M+COs would have an incentive to direct beneficiaries who use fewer healthcare services to the risk plan and those who use more healthcare services to the cost plan.

Table 3.8
Total Number of Counties with Multiple Plans
by Plan Type for Each Sample Year

Counties with Multiple Plans	1993	1995	1997	1999	Totals
Risk, HCPP	46	86	94	34	260
Risk, Cost	19	41	53	71	184
Risk, Demo	0	1	17	68	86
Cost, HCPP	11	10	14	4	39
Cost, HCPP, Risk	6	1	2	7	16
Cost, Demo, Risk	3	4	4	0	11
Demo, HCPP, Risk	5	1	2	0	8
Demo, HCPP	0	0	0	2	2
Cost, Demo, HCPP, Risk	1	0	0	0	1
					Average
Number of counties with multiple types of plans[h]	91	146	185	186	152
- as percent of total number of counties	2.90%	4.66%	5.90%	5.93%	4.85%
Number of counties with multiple plans	154	268	511	484	354.25
- as percent of total number of counties	4.91%	8.55%	16.30%	15.44%	11.30%
Percentage of counties with multiple plans with multiple types of plans	59.09%	54.47%	36.20%	38.43%	47.05%
Percentage of counties with multiple plans with only one type of plan	40.91%	45.52%	63.80%	61.57%	52.95%
Number of urban counties with multiple plans	83	136	217	233	167.25
- as percent of total number of counties with multiple plans	53.90%	50.75%	42.47%	48.14%	48.82%

h. Many counties had multiple plans in a given year. This table illustrates the number of counties that had more than one type of plan, and the prevalence of different combinations of plans. In 1995, two counties had three plans, two of which were HCPP and risk, the third unknown. These are not listed in this table.

This evidence therefore does not support the hypothesis that this aspect of the BBA caused provider exit.

Table 3.9 provides results from the linear fixed effects regression model controlling for state effects. The table shows positive and significant coefficients on the cost, risk and HCPP variables for all counties and for counties with zero, one or two plans. The positive sign is not surprising; initially having a plan increases the likelihood of having a plan in the next time period simply because if it is profitable to operate in one period, all things being equal, it will be profitable to operate in the next period. The coefficients indicate that HCPP and risk plans may have been more greatly affected by the BBA; however, in order to formulate any conclusions, formal analysis of these relationships was required. To better understand the impact of the required changes, I used difference-in-difference analysis to determine whether different plan types responded differently to the policy, for example if cost plans and HCPP plans exited more frequently than risk plans exited.

Table 3.10 indicates that risk plans responded differently to the policy than did either cost or HCPP plans. The table provides the coefficients for the difference in effects of cost, HCPP and risk plans from each other following the BBA. Both the cost-risk coefficient and the HCPP-risk coefficient are positive and significant indicating the cost and HCPP variables were more greatly affected by the policy. Risk policies were eliminated as of 12/31/98, but their transition to M+C plans was the least disruptive in terms of how the transition affected their beneficiaries and offerings. Most plans offered Part A and Part B, but could continue to provide only Part B to current enrollees if their plan was limited to Part B at the time of the BBA. Provider networks were also already established. Most importantly, the manner in which these plans were reimbursed for their enrollees did not change.

Table 3.9

Dependent Variable is the Number of Plans per County

	All Counties	Counties with 0 plans in 1993	Counties with 1 or 2 plans in 1993	Counties with 3 or more plans in 1993[i]	Counties in top 1/2 combined payrate in 1997[j]	Counties in top 1/2 combined payrate in 1999
	9391 obs.	7494 obs.	1696 obs.	201 obs.	5912 obs.	2309 obs.
Policy	-0.74*** (0.04)	-0.34*** (0.03)	-1.11*** (0.11)	-1.05 (0.84)	-0.74*** (0.05)	-1.11*** (0.10)
Cost	0.52*** (0.06)	0.49*** (0.07)	0.32** (0.11)	-0.21 (0.36)	0.52*** (0.08)	0.64** (0.23)
HCPP	0.83*** (0.06)	0.85*** (0.11)	0.53*** (0.09)	0.78 (0.51)	0.84*** (0.06)	0.86*** (0.11)
Risk	0.71*** (0.04)	0.72*** (0.03)	0.65*** (0.08)	0.34 (0.79)	0.64*** (0.04)	0.68*** (0.07)
PartA[k]	0.78** (0.29)	0.99*** (0.23)	1.62 (0.75)	2.58 (2.12)	1.18* (0.46)	0.96 (0.77)
PartB	0.01*** (0.61)	5.77*** (0.50)	1.10*** (1.53)	1.21*** (3.46)	11.58*** (0.79)	14.97*** (1.27)
PopMile	0.16*** (0.04)	0.08* (0.00)	0.20 (0.15)	0.10 (0.11)	0.10 (0.04)	0.01 (0.10)
Urban	1.32*** 0.03	0.77*** (0.03)	0.89*** (0.07)	0.92*** (0.23)	1.33*** (0.04)	1.46*** (0.06)
PCI	0.01** (0.00)	0.01*** (0.00)	0.02** (0.07)	0.04 (0.02)	0.02*** (0.00)	0.02*** (0.01)
WI	0.18*** (0.04)	0.01 (0.04)	0.21** (0.63)	-0.20 (0.09)	0.22*** (0.05)	0.23*** (0.07)
Plan=1,2	0.36*** (0.04)					
Plan=3,4	1.52*** (0.10)					

*** = .001 significance

** = .005 significance

* = .01 significance

i. 67 (2 percent) of counties had three plans in 1993. 29 (less than 1 percent) had more than three plans in 1993.

j. Counties in top 1/2 combined payrate in 1997" means that the regression considered only counties whose combined 1997 Part A and Part B payment rates were higher than the average combined rate. Counties in the top 1/2 combined payrate in 1999" is similarly defined.

k. PartA, PartB, PopMile, PerCapIn and WI are re-scaled by a factor of 1,000 (i.e. PartA = PartAAge payment rate divided by 1,000).

Table 3.10
Comparison of the Effects of the BBA on Different Plan Types

	Risk	HCPP
Cost[1]	0.06*** (0.01)	-0.01 (0.01)
Risk		0.07*** (0.01)

1. Sample size is 9391 observations.

Conversely, cost plans had been paid on a fee-for-service schedule, so plans wishing to convert to M+C plans had a greater administrative burden to determine the profitability of continuing to operate. While coverage changes were not always required (cost plans already offered Part A and Part B) enrollees could retain services of doctors and hospitals outside of the plan. The new M+C regulations required availability of services from doctors and hospitals within the plan. This meant any cost plan wishing to convert to a M+C plan would have to contract with doctors and hospitals to ensure adequate services for their enrollees. Additionally, cost plans were not permitted to expand; any cost plan wishing to increase enrollment was required to convert to a M+C plan.

HCPP plans were similarly affected. Since HCPPs did not provide Part A coverage, converting to a M+C plan required administrative costs of finding doctors and hospitals and negotiating those contracts. Since HCPP contracts were eliminated immediately (12/31/98) if they did not fit the new definition of HCPP, providers had less time to consider new costs of coverage and the administrative costs associated with the change. Many of these plans converted to cost plans as an intermediate step, as is evidenced by the increase in cost plans despite no new cost plans being permitted.

It is apparent that the M+C Program did affect the distribution of plan types; however, the regression analysis indicates that the type of plan did not significantly affect the overall number of plans per county or the change in the number of plans per county. For this reason, the hypothesis that the Medicare+Choice Program's transition requirements caused counties to lose plans must be rejected.

3.5.2 Payment Rates

The payment that Medicare pays M+COs is a monthly per-enrollee payment for each eligible beneficiary electing coverage from that provider, regardless of the actual cost the provider incurs treating a particular enrollee. Prior to the BBA, payment rates were based on Medicare fee-for-service expenditures by county and were adjusted to account for varying beneficiary characteristics such as age, sex, welfare, and employment status. This method caused concern primarily because it resulted in a wide range of payment rates between adjacent counties (in some cases rates varied over 20 percent). Erratic payment updates and poor risk adjustment calculations were among other concerns (see Federal Register, 1998, p. 35004). To narrow these discrepancies, the BBA mandated Medicare payment rates to be the greater of a blended payment rate, a rate equal to a minimum percentage increase over the prior year's rate, or a minimum per county amount determined by HCFA.[19] Medicare providers under the new Medicare+Choice Program were to receive for each enrollee a monthly payment equal to 1/12 of the annual county-wide rate that applies for the county in which the enrollee lives, adjusted by demographic factors applicable to that enrollee.

---

[19] New payment rate calculations applied only to Medicare+Choice plans. Remaining cost and fee-for-service plans continued to be reimbursed as before.

The blended payment rate combines the local rate and the national rate (adjusted for input prices and by a budget neutrality factor) and was intended to reduce the disparity in rates across counties by increasing the lowest rates and decreasing the highest. The local rate is derived from the 1997 rate. The national rate is a weighted average of all area-specific rates adjusted for risk factors that are used to calculate payments, as though all eligible individuals were members of the same Medicare+Choice plan. These blended rates began to be phased in in 1998, and were scheduled to be fully phased in by 2003 so that in 2003 and thereafter, county payment rates would be composed of a 50 percent area specific rate and a 50 percent national rate.[20] The budget neutrality factor was designed to ensure that the amount paid under this new methodology equaled the amount that would have been paid if payments were based entirely on local rates as they had been previously.[21] The minimum percentage increase was established at 2 percent over the prior year's rate. The minimum payment amount applies to all 50 states and the District of Colombia; it is adjusted for enrollee demographic or other risk factors. The floor rate was intended to increase the rates in historically lower-rate counties where managed care plans had not been offered. The unadjusted per-enrollee amount was $367.00 in 1998 and $380.00 in 1999 (see Cawley, 2001, p. 7).

Table 3.11 provides summary statistics on payment rates from 1993 through 1999. Between 1993 and 1995, the average Part A payment rate increased 13.42 percent, while the average Part B payment rate increased 4.32 percent. These increases may have encouraged the observed increase in managed care provider participation in the years from 1993 to 1997, especially if continued increases were anticipated. Similarly, between 1995 and 1997, the average Part A payment rate increased 21.05 percent, while the average Part B payment rate increased 14.46 percent.

---

[20] The Balanced Budget Refinement Act of 1999 changed the transition schedule by providing that the new method should account for ten percent of the blend in 2000 and 2001, and no more than twenty percent of the blend in 2002. See HCFA's web site: Public Law 106-113, Subtitle B, Section 511 for the new risk adjustment methodology.

[21] In 1998 and 1999, the budget neutrality factor reduced the rates below the minimum payment amount and the 2 percent increase amount prescribed by HCFA, so no county received a blended payment rate.

Table 3.11
Percentage Changes in County Wide Part A Aged and Part B Aged Payment Rates in Each Sample Time Period

	Part A		Part B	
Years	All Counties	Counties with at least one Managed Care Contract	All Counties	Counties with at least one Managed Care Contract
1993-1995	13.42%	12.99%	4.32%	3.05%
1995-1997	21.05%	20.13%	14.46%	11.89%
1997-1999	-5.99%	-6.77%	35.96%	33.09%

The new method of determining payments did favor counties without managed care contracts, but counties that already had plans also continued to receive significant payment increases. From 1997 to 1999 average Part B payment increased 35.96 percent overall, and 33.09 percent for those counties with at least one managed care plan. These large increases did not continue universally however. The average Part A payment rate decreased by 5.99 percent overall, and by 6.77 percent in those counties with at least one managed care plan.[22] Still, since Medicare+Choice providers were required to offer both

---

[22] The requirement that payments must be at least two percent above the prior year's rate would preclude a decrease in Part A rates. While this fact is as of yet unexplained, I believe the minimum increase is considered overall, i.e. for Part A and Part B combined, in which case all counties' rates do meet the requirement.

Part A and Part B coverage, this meant an increase in combined payment rates of 29.97 percent overall and 23.32 percent for those counties with one or more plans. Table 3.12 provides the average payment rates and shows that plans continued to concentrate in counties with higher per county payment rates.

Table 3.12
Part A Aged and Part B Aged County Wide Payment Rates by
Number of Plans Per County in the Relevant Year

	Number of Plans = 0					
	Average Part A	Average Part B	Average Parts A & B	As Percent of National Average Part A	As Percent of National Average Part B	As Percent of National Average Parts A & B
1993	187.11	109.42	296.53	98.46	97.46	98.09
1995	209.73	112.71	322.45	97.30	96.23	96.93
1997	250.81	127.71	378.52	96.13	95.26	95.83
1999	236.95	176.08	413.03	96.60	96.60	96.60
	Number of Plans = 1 or 2					
	Average Part A	Average Part B	Average Parts A & B	As Percent of National Average Part A	As Percent of National Average Part B	As Percent of National Average Parts A & B
1993	215.82	132.11	347.94	113.57	117.67	115.09
1995	237.24	138.47	375.71	110.07	118.23	112.94
1997	251.54	143.16	394.70	96.41	106.79	99.93
1999	248.28	163.38	411.67	101.22	89.64	96.28
	Number of Plans = 3 or more					
	Average Part A	Average Part B	Average Parts A & B	As Percent of National Average Part A	As Percent of National Average Part B	As Percent of National Average Parts A & B
1993	229.96	146.77	376.73	121.01	130.73	124.62
1995	262.07	150.88	412.94	121.59	128.83	124.13
1997	315.04	165.30	480.34	120.74	123.30	121.61
1999	292.91	217.65	510.56	119.41	119.41	119.41

To better understand the effect of payment rates on M+C participation after the BBA, the subset of data covering years 1997 to 1999 was studied. Table 3.13 provides payment rate summary statistics for all counties with plans in 1997 or in 1999. The combined Part A and Part B rates are the most relevant since providers were required to offer both Part A and Part B to all new enrollees. Counties losing a plan did have a lower average payment rate in both 1997 and 1999 than counties gaining a plan. However, counties losing a plan had a marginally higher combined payment rate than counties maintaining the same number of plans in 1997, and only a slightly lower average than those counties in 1999. The combined payment rate for counties losing plans was also higher than the average rate in all counties in both years. From Tables 3.12 and 3.13, it appears as though plans were responsive to payment rates, and that in the counties in which plans participated, payment rates were not increasing as much as they were on average over all counties. Whether this was a factor in plan exit must be determined.

Table 3.13
Comparison of Average Payment Rates of Counties Gaining or Losing a Plan Between 1997 and 1999, with Counties Having No Change in Number of Plans

1997	All Counties	Counties Losing a Plan	Counties Gaining a Plan	Counties with Plans & No Change
Part A Payment	260.92	272.81	292.87	275.96
Part B Paymnet	134.06	146.08	146.13	142.8
Parts A & B	394.98	418.99	439.01	418.76
1999				
Part A Payment	245.29	254.68	265.53	256.37
Part B Paymnet	182.27	189.24	197.31	190.50
Parts A & B	427.56	443.92	462.84	446.87

The regression results in Table 3.9 indicate that Part B rates had a greater influence on the number of plans per county than did Part A rates. Part B rates are positive and highly significant regardless of the number of plans originally offered in a county, and regardless of whether those counties fell in the top or bottom half of the distribution of all payment rates. Part A rates were positive and significant in counties with zero plans in 1993, and slightly significant if the counties fell in the top half of the distribution of all payment rates. Similarly, the regression results show that Part B rates had a significant effect in counties with zero, one or two plans in 1993, and among all counties overall. Part A rates were also positive and significant for all counties, as well as for counties with zero plans in 1993. Since only 67 counties (two percent of all counties) had three plans in 1993, and only 29 counties (less than one percent of all counties) had more than three, the insignificance of this result is not problematic. Given the positive effect of Part A and Part B payment rates on the number of plans per county, and the fact that combined Part A and Part B rates increased overall approximately 30 percent for all counties and 23 percent for those counties with at least one managed care plan, the hypothesis that new payment rate calculations resulted in lower rates and therefore caused providers to exit is rejected.

3.5.3 Uniform Benefits Requirement

Two of the goals of the new M+C Program were to increase beneficiaries' managed care options, and to ensure those options did not discriminate among beneficiaries. The M+C Program met the first goal. To meet the second goal, the BBA mandated that every individual entitled to Medicare Part A and enrolled under Part B could elect to receive benefits through a M+C plan.[23] Beneficiaries no longer had to compare plans offering only Part A with those offering only Part B or parts of Part B, or any other combination of possible coverage. All M+COs were required to provide their enrollees residing in the geographic area in which their plan services were offered, all services covered under original Medicare, both Part A and Part B.

---

[23] An exception was made for individuals with End Stage Renal Disease (ESRD) who were not permitted to enroll in the new M+C Program. Other than ESRD beneficiaries, eligible individuals were permitted to enroll in any M+C plan operating in the county in which the individual resides.

Consistent with the goal of non-discrimination, the BBA instituted the UBR. The UBR stated that benefits and premiums (money paid to the M+CO by the beneficiary for Part B coverage, Part A coverage when required, and/or additional benefits) must be uniform under a M+C plan throughout that plan's defined service area (a county or group of geographically adjacent counties). Prior to the BBA, Medicare providers could vary premiums and benefit offerings by county, using non-Medicare funds to finance the cost of providing benefits greater than the minimum required by Medicare. This allowed providers to compete in counties with the highest payment rates and still operate in lower payment counties offering fewer (perhaps only minimum) benefits. This was known as a flexible benefits policy; the uniform benefits requirement effectively ended this policy. Beginning in 1998, any M+CO that was offering higher benefits in one county than in another in the same service area could no longer do so.

To prevent M+COs from carving up service areas in order to charge different premiums or offer different benefits in different counties, service area designations must be pre-approved by HCFA. In evaluating proposals requesting multiple service areas, HCFA considers the patterns of care in the community and of that provider as well as the service areas of other providers in the area. Service area designations may not be artificially delineated, i.e., service areas must be configured according to established patterns of care and the proximity of beneficiaries to doctors and hospitals contracted by the plan . This requirement for strict compliance of proper service area configurations is imperative to prevent providers from discriminating against beneficiaries through gerrymandering. Per the Department of Health and Human Services Federal Register, "Each proposed M+C service area must be an area in which the full range of covered services are available and accessible to all Medicare enrollees primarily through providers in the service area . . . we do not believe there is a valid reason to charge different premiums by county, for example, when all Medicare beneficiaries enrolled in the organization will be using the same providers" (1998, p. 34972).

Intuitively one would expect to see plans exiting lower payment counties. Exiting one county, however, is subject to HCFA review, as such exit would cause a re-definition of that provider's service area. Per the Federal Register, "The fact that Medicare pays different capitation rates by county is not a sufficient reason to establish service areas consisting of individual counties" (1998, p. 34972). If exiting lower payment counties creates a proposed service area that is not consistent with patterns of care within the community, that proposed service area will not be permitted. It may then be in the provider's interest to exit the entire service area, especially if competition in those counties in the service area is high, i.e., many providers competing for the same enrollees.

Because HCFA will not permit M+COs to re-structure service areas to include higher payment counties and exclude lower payment counties, a provider may have to operate in all counties or in none. Since any profits received in the higher payment county may not be enough to offset the losses in the lower payment counties, providers may exit the entire service area.

Provider participation in Wisconsin provides a good example of service area selection. The highlighted counties in Figure 3.1 each had one HCPP plan from 1993 to

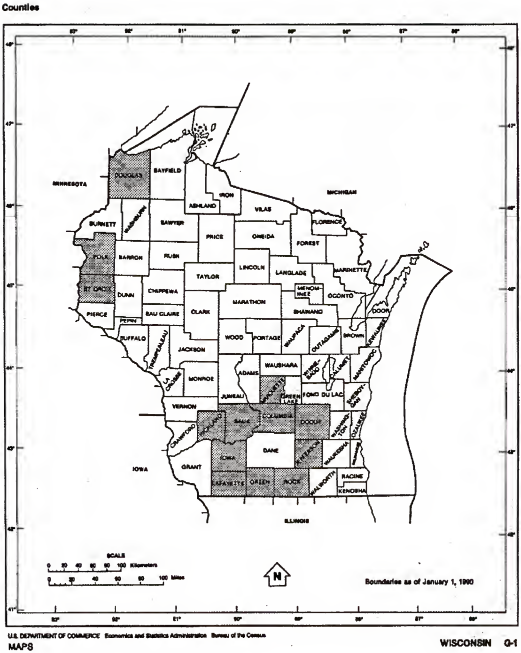

Figure 3.1
Plan Exit and Entry in Wisconsin: 1997 and 1999

1997, as did Dane County, which is in the center of the other counties. After the BBA, the HCPP plan exited all counties including Dane County.[24] In doing so, it forfeited potential profits from Dane County, which had a significantly higher average payment rate over the years 1997 to 1999 than the average payment rate of the surrounding counties ($378.56 versus $351.81). Dane County elderly population per square mile was also greater, at 39.05 elderly per square mile versus 12.96 for the surrounding counties. In this case, the surrounding ten counties did not gain a plan when the HCPP plan exited, however Dane County gained two plans, one risk and one cost. These plans were independent of the previously exiting HCPP plan. Serving only one county enabled the entering provider to select only that county with the greatest potential profits. HCFA approved this single-county service area, despite the appearance of approval being inconsistent with HCFA policy. If the incumbent HCPP had petitioned to exit all counties except Dane, it is unlikely HCFA would have approved the service area.[25]

The intent of the uniform benefits requirement seems similar to that of other legislation enacted under universal service principles.[26] Requiring M+COs to offer uniform benefits across their service areas ensures that Medicare enrollees are not discriminated against due to their geographic location. By requiring uniform benefits,

---

[24] In this case, the exiting plan was a HCPP plan that was required to convert to M+CO if eligible to do so, or to a cost plan if it did not meet the new requirements for an HCPP plan set out in the BBA. It cannot be assumed that this exit was due to county selection. Any plan exiting 11 counties and attempting to re-enter only one, as might be done to circumvent the UBR, would not be permitted.

[25] In all counties within the US, there is only one other instance in which plans exited all counties surrounding one high payment county (Tehama County, CA gained a plan while all contiguous counties lost one or more plans). Generally, plans exited entire regions.

[26] Anton et al. (1998), and Crew and Kleindorfer (1998) explore market entry and monopoly under universal service obligations. Parallels can be drawn between their observations and observations of the Medicare program.

M+COs would be forced to limit extensive benefits in the high payment counties and to provide equal benefits in the high and low payment counties.

The effect of the uniform benefits requirement is the most difficult to analyze since plan/benefit level data are unavailable. While the effects of payment rates and plan transitions could be seen using regression coefficients, the UBR requires greater dissection. In the fixed effects regression, the policy variable captures the effect of the BBA. Given that the other changes mandated by the BBA were captured by specific variables, this leads to the presumption that the policy variable is measuring the effects of the uniform benefits requirement if not solely, at least in part. In Table 3.9, the policy variable is negative and significant regardless of counties included or the choice of segregation. The second regression model supports this result. In Table 3.14, the year variables represent the effects of all variables not otherwise specified, in particular, the effects of administrative changes and therefore the UBR. The 1997-1999 variable is negative and significant in all cases except for counties with three or more plans in 1993. Conversely, the 1995-1997 variable is positive and significant for all cases including counties with three or more plans in 1993. If the policy variable indicates the effects of the UBR, then the regression analysis supports the hypothesis that the UBR contributed to provider exit. It is still unclear how or why.

Chapter 2 illustrates that if payment rates within a service area are disparate, providers have an incentive to exit the lower payment county in order to earn greater profits in a higher payment county. This incentive increases as a provider's cost advantage over its competitors increases.

Table 3.14
Regression Results--
Dependent Variable = the Change in the Number of Plans Per County

	All Counties	Counties with 0 plans in 1993	Counties with 1 or 2 plans in 1993	Counties with 3 or more plans in 1993	Counties in top 1/2 combined payrate in 1997	Counties in top 1/2 combined payrate in 1999
	3976 obs.	1696 obs.	2014 obs.	266 obs.	2854 obs.	996 obs.
1997-1999	-0.45*** (0.04)	-0.63*** (0.05)	-0.42*** (0.04)	0.50 (0.41)	-0.49*** (0.06)	-0.51*** (0.07)
1995-1997	0.50*** (0.04)	0.83*** (0.05)	0.15*** (0.43)	1.03** (0.19)	0.60*** (0.06)	0.60*** (0.07)
Cost	-0.00 (0.15)	0.43 (0.43)	0.14 (0.14)	0.62 (0.74)	-0.0049 (0.25)	0.80 (0.42)
HCPP	-0.16 (0.07)	0.17 (0.36)	-0.03 (0.06)	0.54 (0.51)	-0.08 (0.11)	-0.12) (0.14)
Risk	-0.40 (0.19)	-0.06 (0.23)	-0.85*** (0.19)	1.19 (1.88)	-0.28 (0.31)	-0.27 (0.42)
Part A Change[m]	0.18** (0.06)	0.19* (0.08)	0.12 (0.07)	0.93 (0.72)	0.25** (0.09)	0.25 (0.11)
Part B Change	0.64*** (0.23)	0.97*** (0.16)	0.45*** (0.13)	0.32 (1.1)	0.68*** (0.20)	0.60* (0.24)
Eligible Change	-0.09 (0.07)	-0.02 (0.62)	-0.41*** (0.11)	0.01 (0.19)	-0.09 (0.08)	0.00 (0.10)
Urban	0.12 (0.21)	0.09 (0.18)	0.81 (0.56)		0.06 (0.25)	0.032 (0.38)
WI	-1.59*** (0.45)	-3.21*** (0.61)	-0.04 (0.50)	-2.20 (2.57)	-0.88 (0.60)	-0.54 (0.68)

m. PartAChg and PartBChg are re-scaled by a factor of 100 (i.e. PartAChg = PartAChg payment rate divided by 100).

As competition becomes more intense (a greater number of competitors are able to profitably offer similar services), the incentive to provide greater benefits in the higher payment counties decreases because the profits a provider can earn by offering higher benefits decreases since all the other providers can also offer higher benefits. By offering higher benefits, profits are diminished since the per-enrollee cost increases while per-enrollee payments remain the same. An increase in the payment rate means providers are able to (and therefore must) increase benefits in order to effectively compete. Under the BBA, increasing the payment in high payment counties without increasing the rates in low payment counties proportionately simply increases the incentive to exit lower payment (generally less profitable) counties.

Assuming perfect competition, if a provider has a large cost advantage over its competitors, it may be able to profitably increase benefits in the lower payment counties and serve all enrollees in all counties. When no provider has a significant cost advantage, each offers the highest profitable level of benefits possible. No provider is able to earn extraordinary profits in any one county. It follows that this is most likely to be the case when payment rates are low. Low payment rates provide little opportunity to offer more generous benefits packages (or for a provider with a cost advantage to capitalize on that advantage). Keeping benefits as close to the minimum required by Medicare reduces competition and ensures all enrollees receive the same benefits without discrimination.

Based on these results, the three factors likely to predict exit should be considered: limited cost differences among competitors, low payment rates, and disparate payment rates among contiguous counties. Although inaccessibility to provider cost data precludes examining the first factor, the next two can be investigated.

To better understand the dynamics of this effect, the data set was limited to those 40 states with counties that had lost a plan from 1997 to 1999. Those states are listed in Table 15. Next, states that lost plans in every county were eliminated (Delaware and Rhode Island), as were states that lost a plan but neither gained a plan nor had any other plan offerings (Mississippi, Nebraska, South Carolina and Vermont) and therefore nothing to which one could compare the counties with losses. This left the 32 un-shaded states in Table 3.15.[27]

These states were examined to see if any patterns of entry and exit existed. It was found that provider participation was clustered in the vast majority of cases: all activity, gains, losses and participation occurred in contiguous counties in the majority of cases.[28] Table 3.16 lists the exceptions: the total number of non-contiguous counties that had plan exit, entry, or participation.

Using the states listed in Table 3.15, the factors relevant to the UBR's effect were considered. Low payment rates decrease competitor's incentives to compete for enrollees by offering greater benefits because potential profits from enrolling beneficiaries are small.[29] If competition is reduced, providers are more likely to stay in a county rather than exit to earn greater profits in a higher payment county. In Table 3.13, counties losing a plan did have a lower average payment rate than counties gaining a plan in 1997, and a slightly lower average rate than those maintaining the same number of plans in 1999, but the rate was still above the average rate for all counties. This indicates that these counties may have been profitable but due to the relatively lower rate, were not profitable enough to maintain participation.

Next, it is necessary to consider the disparity of payment rates among contiguous counties. As explained above, if the disparity in payment rates between counties was

---

[27] Louisiana was deleted because plans exited due to a buyout of HMOs that local doctors and hospitals did not support; they refused to contract with the new provider. Texas was deleted due to insufficient data.

[28] These groups did not coincide with metropolitan statistical areas, as might be expected. Of counties with plans, 621 (47.81 percent) were in a metropolitan statistical area, while 678 counties with plans were not.

[29] A low payment rate is defined as a rate high enough for a M+CO to earn positive profits if operating only in that county, but not high enough to allow extra-normal profits under any conditions (i.e., profits that are greater than might be earned from non-Medicare services).

Table 3.15
List of States Losing Plans from 1997 to 1999,
with Counties Losing a Plan as a Percentage of the Total Number of Counties Per State

State	Number of Counties Losing a Plan	Total Number of Counties per State	Percent of Counties Losing a Plan
AR	2	75	2.67%
AZ	12	15	80.00%
CA	32	58	55.17%
CO	8	63	12.70%
CT	2	8	25.00%
DE	3	3	100.00%
FL	26	67	38.81%
GA	2	159	1.26%
IA	4	99	4.04%
ID	2	44	4.55%
IL	6	102	5.88%
IN	3	92	3.26%
KS	3	105	2.86%
KY	4	120	3.33%
LA	32	64	50.00%
MA	5	14	35.71%
MD	20	24	83.33%
MN	17	87	19.54%
MO	1	115	0.87%
MS	1	82	1.22%
MT	4	56	7.14%
NE	2	93	2.15%
NH	3	10	30.00%
NJ	12	21	57.14%
NV	3	17	17.65%
NY	17	62	27.42%
OH	15	88	17.05%
OK	1	77	1.30%
OR	11	36	30.56%
PA	2	67	2.99%
RI	5	5	100.00%
SC	7	46	15.22%
TN	2	95	2.11%
TX	9	254	3.54%
UT	9	29	31.03%
VA	33	132	25.00%
VT	6	14	42.86%
WA	23	39	58.97%
WI	13	72	18.06%
WV	3	55	5.45%

Table 3.16
Counties with Exit or Entry that are Non-Contiguous
with Any County with Plan Participation, Entry, or Exit

	Exit	Entry	Participation
Idaho	0	0	1
Illinois	0	0	1
Iowa	2	0	0
Kansas	1	0	4
Kentucky	0	0	2
Missouri	0	0	1
Mississippi	1	0	3
Nebraska	0	0	2
Oklahoma	0	0	1
Tennessee	2	0	0
Wisconsin	0	0	1
Total	6	0	14

great enough, the UBR should cause plans to exit the low payment counties. Table 3.17 provides information on the mean payment rate for counties gaining, losing, and providing the same number of plans from 1997 to 1999.

Table 3.17
Comparison of Average Part A and Part B Payment Rates
Between Counties Gaining or Losing Plans between 1997 and 1999
in States Experiencing Plan Losses

	Mean Part A Change	Mean Part B Change	Mean Parts A and B Change
Gained a Plan	11.39	33.26	44.65
Same # of Plans	13.44	31.57	45.01
Loss of a Plan	12.61	28.68	41.29
Gain vs Same	-2.05 (1.54)	1.69 (0.80)	-0.36 (1.09)
Gain vs. Loss	-1.22 (1.67)	4.58*** (0.87)	3.36** (1.18)
Same vs. Loss	0.84 (1.43)	2.89*** (0.74)	3.72*** (1.01)

The difference in average payment rates between counties gaining a plan and counties maintaining the same number of plans is not significant. However, the difference in average payment rates between counties losing a plan and counties gaining a plan or maintaining the same number of plans is highly significant for Part B rates and for the combined rates. The mean change in Part B rates dominates the mean change in Part A rates, indicating that Part B rates play a greater role when considering the disparity of rates among counties gaining and losing a plan, and those with no change in the number of plans. This is most likely due to the magnitude of the increase in Part B rates relative to the smaller change (decrease) in Part A rates. Difference-in-difference analysis shows the difference in these changes from 1997 to 1999 to be highly significant at the .001 level. This suggests that the disparity in payment rates may have played a role in exit.

The minimum payment rate when all counties are included was 35.38 percent of the maximum rate in 1997; by 1999 that disparity had decreased to 51.75 percent of the maximum. However, within the above listed subset of states, the minimum payment rate for a county in 1997 was only 29.32 percent of the maximum rate. While the disparity in rates within the subset of states decreased in 1999 (similarly to the decrease in disparity among all counties), it was still 47.58 percent. Therefore, the disparity in rates among the subset of counties was greater than the disparity of rates among all counties. Furthermore, difference-in-difference analysis indicates that the disparity in rates in the subset of counties was significantly greater than the disparity of rates over all counties. This difference is statistically significant at the .001 level.

It is hypothesized that the disparity in payment rates in counties losing a plan that are contiguous to counties not losing a plan was great enough that it caused providers to be unable to profitably operate in all counties. Providers must therefore exit the entire service area (as previously illustrated). This is what appears to have occurred.

The data indicate a greater disparity of payment rates in contiguous counties in states in which provider exit occurred. Also the payment rates in those counties, although lower than payment rates in counties gaining a plan, were above average. Therefore, there is support for the hypothesis that the UBR contributed to provider exit, and so the hypothesis cannot be rejected.

3.5.4 Additional Factors Affecting Participation

While the majority of studies on the Medicare+Choice Program focus on the effect of payment rates and consider increases in these rates to be essential to preventing exit, there are sources that do not consider payment rates to be influential. Table 3.18 provides information on the effects of the number of competitors per county and the population per square mile per county. It is clear that plans tend to locate in counties with greater population, which enables them to spread their risk and fixed costs. One explanation for exit involves the number of enrollees required. It is estimated that plans need to enroll at least 10,000 beneficiaries within a few years of operation in order to spread their financial risk and their fixed costs (see GAO/T-HEHS-97-133, 1997, p. 7). Medicare+Choice plans also are required to have at least 5,000 commercial (non-Medicare) members in non-rural areas and at least 1,500 commercial members in rural areas. For these reasons it is imperative to have a large population of eligible beneficiaries.

Table 3.18
Population and Competition in Counties Losing a Plan from 1997 to 1999

1997	All Counties	Counties Losing a Plan	Counties Gaining a Plan	Counties with Plans & No Change
Population / Mile	37.97	84.70	107.19	55.52
Number of Plans	0.69	2.37	0.97	1.69
1999				
Population / Mile	37.97	84.70	107.19	55.52
Number of Plans	0.65	1.05	2.14	1.69

One of the most important considerations is the number of competitors competing for those enrollees. Table 3.18 shows the average number of plans per county in 1997 was 0.69. In counties losing a plan, the average number of plans per county (prior to the exit) was 2.37. Additionally, considering the average number of plans per county in those counties in which entry occurred shows that M+COs entered counties in which there were fewer competitors. Of those counties exhibiting no change in the number of plans, between 1997 and 1999 the average number of plans per county was 1.69. It appears that on average, counties supported between one and two plans; one would encourage entry, two would increase exit. More precisely, there may be an ideal beneficiary per plan ratio. In counties losing a plan, the average was approximately 36 enrollees per plan; in counties gaining a plan, this average was approximately 111 enrollees per plan. Still, competition cannot be the sole cause of exit. Approximately half of all counties with exit from 1997 to 1999 were left with zero plans. If competition were the main cause of exit, the data should show a greater percentage of exit in counties with multiple plans.

The empirical evidence in Table 3.9 indicates that counties with one or two plans were not affected by the BBA as greatly as counties with three or four plans (the difference in the effects is significant at the .001 level). Additionally, in regression analysis with exit as the dependent variable, the coefficient on the number of plans in a county is positive and significant at the .001 level, meaning the probability of exit increases as the number of plans per county increases. According to a GAO report, plans will enter a market and compete for a limited number of beneficiaries for only a few years (GAO, 1997a). If in that time they are unable to attract the required number of commercial members or the number of total members to make it financially viable, they will exit. Entry and exit are therefore not necessarily entirely dependent on counties' payment rates.

Other factors affect the initial decision to participate more than the decision to continue or to exit, but may contribute to exit overall. One such factor is the instability of the payment rates. It is difficult for M+COs to determine profitability when each year payment rates change, the blended rate phase-in is uncertain, and administrative requirements change. This instability becomes a particularly strong deterrent in counties with fewer beneficiaries. The fewer beneficiaries a plan is able to enroll, the more sensitive it becomes to rate changes. A small number of expensive claims in a year in which rates drop could generate a deficit for a smaller provider. Operating in less populated areas imposes too great a financial risk.

A third factor is the history of managed care plans in the area. A descriptive GAO paper concluded that HMO presence, the number of Medicare beneficiaries, and employers' policies toward retiree health benefits may play a dominant role in Medicare+Choice provider participation, rather than payment rates (see GAO, 1997a, p. 2). A study by W. Welch (Welch, 1996) completed prior to the BBA supports this argument. Welch found that the factor with the strongest influence on M+CO participation was HMO presence. In the GAO study, the authors use examples of Portland, Oregon and Michigan as illustrative support. In Portland, they cite community familiarity and acceptance of HMOs as the primary reason for high enrollment in managed care plans (41 percent), despite charging beneficiaries a premium (two-thirds of plans in 1997 did not) (GAO, 1997b, p. 2). In Michigan metropolitan areas, provider participation is low despite relatively high payment rates. This is thought to be a result of the retiree benefits provided by the auto industry, which are more generous than most other private plans can afford to provide. The availability of these retiree plans reduces the attractiveness of risk HMOs so beneficiaries are not interested in enrolling in a new Medicare+Choice plan.

A fourth consideration relates to the M+C Program goal of increasing participation in rural areas. Increasing payment rates in rural counties may not be enough to attract M+COs. Rural areas are characterized by a dispersed and/or relatively small population. Consequently, beneficiary access to multiple doctors and hospitals is limited. M+COs might not be able to arrange a network of doctors and hospitals that meets HCFA's accessibility requirements to serve its beneficiaries. M+COs earn profits above government payments by controlling costs. One of the cost-controlling measures is arranging networks in which the M+CO guarantees patients to the doctor or hospital in exchange for lower healthcare rates. However, if providers are monopolists, the M+CO has no bargaining power. Patients must go somewhere for healthcare services and the providers know if they do not contract with the M+CO they will earn non-discounted Medicare rates. Therefore, M+COs are unable to profit in this manner and have no incentive to enter the rural county.

Additionally, a M+CO entering a rural county may experience high demand for services if it does not have high deductibles and co-payments (a M+CO would have difficulty enrolling beneficiaries if it did). This is because payment rates are tied to fee-for-service rates (unless at the floor level) which may be low due to low utilization of services since those services were previously unaffordable. When the services do become affordable to beneficiaries through the plan, the beneficiaries request more services than anticipated, and payments are inadequate to cover the costs (see MEDPAC, 2000). Rural counties are therefore unattractive to M+COs.

Lastly, it has been suggested that payment rates are actually much higher than costs in most counties. This is due to the manner in which payment rates were calculated prior to the BBA. In order to earn the greatest possible profit, managed care providers enrolled generally healthier beneficiaries; in other words they practiced favorable selection. This left those without private insurance plans to participate in the fee-for-service program. Not only did the more sickly individuals require more frequent healthcare, they required more costly healthcare. Because more sickly individuals were enrolled in fee-for-service, these costs were higher than typical costs for treating beneficiaries. Since Medicare payment rates were based on the fee-for-service rates, the rates were higher than the average cost of the beneficiaries being treated by the private providers. After the BBA was passed, favorable selection become impossible because managed care providers were required to accept any eligible beneficiary living in the plan's service area. But the payment rates were still high from the influence of the fee-for-service rates that are still incorporated into the current payment rate calculations.

3.6 Conclusion

The primary goals of the 1997 Balanced Budget Act were to increase private healthcare options for beneficiaries, decrease the disparity in payment rates among contiguous counties, and to encourage growth of Medicare managed care in rural counties. These first two goals appear to have been met. Healthcare options now mirror those available to non-Medicare beneficiaries, and the disparity in payment rates has decreased dramatically. The third goal, however, has proved more elusive. Rather than increasing participation in rural counties, overall participation has decreased in both rural and urban counties since the BBA was passed.

Many factors appear to have contributed to Medicare managed care provider exit following the BBA. It does not appear that the introduction of the M+C Program itself caused provider exit. While the requirements to convert traditional plans to M+C plans did cause a shift in the type of plans offered, it does not appear to have caused a significant absolute decrease in the number of plans available. Cost and HCPP plans continued to exist in a smaller percentage of the market, and also converted to M+C plans. The majority of risk plans converted to M+C plans. Empirical results indicate that the transition requirements did not have a negative effect on the number of plans per county.

Similarly, changes in the manner in which payment rates were calculated (and therefore payment rate changes), do not appear to have directly caused providers to exit. While empirical results indicate both Part A and Part B rates are significant in determining the number of plans per county, the fact that rates increased an average of approximately 30 percent suggests payment rates alone are not likely to have caused exit.

It does appear however that these rates indirectly contributed to exit. By changing the method of calculation, the BBA decreased the disparity of rates among counties, an initial goal of the BBA. However, data indicate that the disparity among rates in states exhibiting exit is greater than the average disparity. Combined with the requirements for uniform benefits, this may have contributed to plan exit.

In summary, the data and empirical evidence indicate that the 1997 BBA did cause Medicare managed care provider exit. This effect is attributed primarily to the uniform benefits requirement, which affected provider participation in contiguous counties. Other changes such as the calculation of reimbursement payment rates and plan transitions were not main contributory factors in this decrease in participation.

The introduction of the M+C Program has many potential benefits. Changes in the method of calculating payment rates is pushing the system of Medicare managed care towards the goal of rates that more accurately reflect actual costs of services. The UBR is pushing the system towards more equal provision of benefits. However, the immediate implementation of the UBR was coupled with a gradual implementation of changing payment rates. This resulted in some of the potential benefits of the M+C Program being lost. If both benefits and payment rates had gradually been adjusted at complementary rates, perhaps the policy would have been more effective and provider exit avoided. To avoid additional exit, payment rates should be adjusted as quickly as possible without further adjustment to the implementation schedule.

One of the goals not met was that of increased provider participation in rural counties. Because of the characteristics of rural counties, policies should be expected to affect them differently than the same policies affect more populous counties. For this reason, a unique set of initiatives might be designed specifically for rural areas. The government could offer a menu of contracts including cost-sharing and profit-sharing options, and allow M+COs to bid for exclusive rights to counties based on these contracts. For example, the government might auction the rights to provide Medicare managed care services to rural counties. M+COs operating in counties closest to those with no providers could bid for monopoly rights within the unserved counties. The bids would be based not only on expected costs to treat beneficiaries, but also on a profit-sharing arrangement that would allow the M+COs to retain a greater share of profits than they are permitted in all other counties. They might also include a cost-sharing method to help insulate M+COs from catastrophic losses they might otherwise not be able to bear due to the smaller number of beneficiaries for which they receive payment.

Another alternative is for the government to contract directly with doctors and hospitals in rural areas. HCFA could pay the same county-wide monthly rate directly to the doctors and hospitals rather than paying M+COs. The doctors and hospitals would receive beneficiaries' co-insurance payments but would not charge beneficiaries for services once the deductible was met. Such a program would allow HCFA to determine whether their monthly payment rates are sufficient to provide treatment, through study of the demand from doctors and hospitals to participate in the program. While this would not necessarily provide beneficiaries with additional services, it would ensure that beneficiaries' costs were lower than fee-for-service rates.

Further research is needed to determine better methods of implementation and more effective ways to extend Medicare managed care benefits to counties in which no M+COs currently operate.

CHAPTER 4
CONTRADICTORY INCENTIVES IN THE MEDICARE+CHOICE MEDICAL SAVINGS ACCOUNT PROGRAM

4.1 Introduction

The Balanced Budget Act of 1997 (BBA) instituted what is arguably the most important change to Medicare managed care since Medicare's inception. This change was the creation of the Medicare+Choice Program (M+C). The Medicare+Choice Program encompassed a variety of measures designed to increase Medicare beneficiaries' managed healthcare choices and to expand Medicare managed care offerings to more of the Medicare eligible population. One of the new options was the Medicare+Choice Medical Savings Account program (MSA). MSA plans combine a high deductible M+C plan with a contribution from HCFA to a medical savings account for the enrolled beneficiary.

The primary purpose of this chapter is to examine the structure of the MSA program and to identify the incentives of both M+COs who might choose to offer a MSA plan, and beneficiaries who might choose to enroll in such a plan. Understanding the MSA program and its impact on Medicare managed care is important in evaluating the overall success of the M+C Program of which it is a part. The analysis will illustrate that the incentives of these parties are incompatible, and that a M+CO will always earn greater profit offering a M+C plan rather than a MSA plan. This theory is supported by the empirical evidence that no MSA plans have been implemented or even proposed since the program's inception on January 1, 1999.

In the BBA, Congress authorized a limited number of beneficiaries to participate in a MSA program demonstration. Under the program, a beneficiary chooses a M+C MSA plan, which is a combination of a high deductible M+C plan (health insurance policy) and a Medicare savings account. Medicare pays the premium for the M+C plan and makes a deposit into the account for the beneficiary. The beneficiary uses the money in the account along with his own personal money if necessary to pay for healthcare services before the deductible is met. After the deductible is met, the M+C plan pays for 100 percent of all Medicare covered healthcare services.

The MSA program seems to be a worthy program for a number of reasons. First, it adds greater flexibility in coverage options for beneficiaries. In addition to obtaining health care services from the plan's network of doctors and hospitals, beneficiaries can use account money to pay for services of non-network heath care providers, for services not covered by original Medicare, or even for services not specifically covered by their plan's policy.[1] This flexibility allows beneficiaries to seek the type of treatment they believe is best for them, and to practice preventative healthcare, which currently is not covered by original Medicare. One of the primary benefits of a MSA plan is that it ties a beneficiary directly to the cost of services and forces beneficiaries to play a greater role in determining their health care purchases until the deductible is met. One of the reasons cited for rapidly increasing healthcare costs is that the ability of individuals to purchase insurance coverage for almost all their health care expenses reduces the personal cost of health care services so greatly that they overuse these services (GAO, 1999, p. 3). MSAs are believed to have the potential to discourage over-utilization of health care services. Because beneficiaries have a limited amount of money in their account, it is thought they will be more prudent in the type of service requested, the doctors and hospitals selected, and the frequency of utilization of health care services. Additionally, MSA plans require a greater investment of a beneficiary's own money before the deductible is met, another factor that should limit overall costs and utilization.

---

[1] It is intended that the policy will include more covered services than original Medicare.

The third benefit of the MSA program is that a MSA plan costs the government the same amount as a M+C plan costs. HCFA pays the same total amount under both plans, except it divides its cost-cutting responsibilities between the M+CO and the beneficiary. This allows HCFA to spread its risks slightly rather than relying solely on the M+COs to control costs. Having two parties responsible for controlling costs can also serve as a benchmark. If the beneficiary is able to obtain necessary services at lower cost than the M+CO either can or does, HCFA will have reason to more carefully monitor the M+CO, and will have greater information to use in developing more accurate payment rates for the county in which the M+CO operates.

In summary, there are a number of apparent benefits associated with the MSA program. However, as of May 2001, no M+COs have proposed to offer a MSA in association with their M+C plans, and so the experiment with MSAs must be deemed unsuccessful. Reasons for the lack of participation are identified in the following analysis.

Chapter 4 proceeds as follows. Section 4.2 details the MSA program. Section 4.3 illustrates the inherent conflicts in the program. Section 4.4 suggests a program reform, and Section 4.5 concludes.

4.2 The Medical Savings Account Program

MSA plans are a combination of a high deductible M+C plan and a contribution to a M+C medical savings account. As defined by the Department of Health and Human Services Federal Register, the MSA is "a tax exempt trust created solely for the purpose of paying the qualified medical expenses of the account holder" (Federal Register, 1998, p. 35032). The MSA program was created as a demonstration project. Under the project, qualified MSA M+COs were authorized to accept enrollees in a MSA plan from January 1, 1999 until January 1, 2003, at which point the project would be evaluated and the MSA program either continued or terminated. The program was limited to 390,000 enrollees, or approximately one percent of the Medicare population. Two restrictions on enrollment differ from enrollment in a M+C plan. First, an enrollee must reside in the United States for at least 183 days of the year in which he is enrolled. Second beneficiaries with "first dollar" government health plans are specifically excluded (i.e. those with Medicaid or Veterans Administration benefits). This is because the intent of the program is for individuals to use their account funds rather than other insurance to pay for healthcare services until the deductible is met.

The MSA program imposes requirements on beneficiaries, M+COs, and HCFA that differ from the requirements each assumes under a M+C plan. Under the MSA program, beneficiaries have greater responsibilities than they have under standard M+C plans. Because MSA plans combine a MSA account with a M+C plan policy, eligible beneficiaries must choose a policy offered by a M+CO, and then choose a bank or other institution to serve as trustee for the account. Beneficiaries then may enroll for one year beginning January 1.[2] At the beginning of the year, HCFA makes a lump sum deposit into the beneficiary's account for the entire year. The beneficiary then uses that money to pay for his health care. The money can be used for medical or non-medical expenses. If the money is used for anything other than a qualified medical expense, the money is taxed as income and may carry an additional tax penalty.[3] After exhausting the money in the account, the beneficiary must use his own money to pay for health care services until he reaches his deductible. If the account money is not used, it remains in the beneficiary's account the following year and is increased by another annual lump sum on January 1. If the beneficiary disenrolls, any money in his account remains and can continue to be used to help pay for healthcare.[4] Beneficiaries may or may not be restricted to particular doctors and hospitals, depending on the policy.[5] Once the deductible is met, the policy coverage becomes effective and the policy pays for covered Medicare expenses. The only payment beneficiaries must make is the Medicare Part B (medical insurance for doctors' services and other outpatient healthcare) monthly premium. The beneficiary pays no monthly premium to the M+CO. In theory, the beneficiary pays a lower monthly premium for what is essentially a catastrophic insurance policy with a high deductible. He uses the account money to cover expenses prior to reaching the deductible.

---

[2] Contrary to other M+C plans, beneficiaries must remain enrolled in the MSA for the entire year; they are not permitted to terminate the plan during the year but may non-renew the following January.

[3] Qualified medical expenses are defined by IRS rules relating to itemized deductions for medical expenses. This definition encompasses a broader range of items than are covered by Medicare (for example prescription drugs and dental care). Items considered qualified medical expenses by the IRS do not necessarily count towards a plan's deductible. Expenses countable toward the deductible are specified by each policy.

[4] Account money of a beneficiary who dies during the policy year is returned to Medicare on a pro-rated basis for the portion of the year the beneficiary was not enrolled.

[5] Unlike Original Medicare and other M+C plans, the Medicare program does not limit what providers can charge a beneficiary. It is each beneficiary's responsibility to ensure charges are commensurate with acceptable Medicare charges and to choose services wisely.

M+COs also have different responsibilities under a MSA plan than they have under standard M+C plans. M+COs must make available to an enrollee or provide reimbursement for all Medicare covered services after the enrollee's countable expenses reach the plan's annual deductible.[6] The M+CO must count towards the deductible either the actual costs paid by the beneficiary for services, or the amount that would have been paid by a beneficiary under a Medicare fee-for-service arrangement, whichever is less (this encourages the beneficiary to obtain reasonably priced health care services, as only reasonable expenses will be counted toward the deductible). M+COs are free to include additional expenses in the countable expenses if they so desire. After the deductible is met, the M+CO pays the lesser of 100 percent of the actual cost of service, or 100 percent of the amount that would have been charged under original Medicare for that beneficiary, including the deductible and coinsurance that the beneficiary would have paid. In other words, M+COs are required to pay the full Medicare payment rate once the deductible is met.

Administratively, the MSA program costs HCFA exactly the same amount as paying the monthly individually adjusted payment rate that is paid to M+COs for M+C plans. Under a MSA plan, HCFA pays into a beneficiary's account the difference between the countywide payment rate (as determined by HCFA for each county in the

---

[6] The maximum allowable deductible is $6,000 per year.

U.S.) and the premium the M+CO would charge a beneficiary under its M+C plan. On January 1, HCFA deposits this difference into the beneficiary's account as a lump sum. By this methodology, each beneficiary in the MSA within the same county receives the same lump sum deposit into his account. In addition to this payment, each month, HCFA pays the premium for the beneficiary to the M+CO, and also pays the M+CO additional money for beneficiaries whose demographically adjusted payment rate is greater than the average county rate that was used to determine the lump sum. The main difference between the payments HCFA makes under the M+C plan and under the MSA plan is under the M+C plan, HCFA pays the entire per-enrollee demographically adjusted rate directly to the M+CO. Under the MSA plan, HCFA pays part of the per-enrollee demographically adjusted rate to the M+CO, and part to the beneficiary. Figure 4.1 illustrates the flow of funds under a M+C plan. The beneficiary's coinsurance payments to the M+CO apply after the deductible has been met.

Figure 4.2 illustrates the flow of funds under a MSA plan. Beneficiary's payments are made only until the deductible has been met. M+CO's payments are made only after the deductible has been met.

4.3 Inherent Conflicts in the MSA Program

The MSA plan reallocates HCFA funds from the M+CO to the beneficiary, and relieves the beneficiary of a monthly or annual policy premium in exchange for a high deductible policy. In both the M+C plans and MSA plans, HCFA incurs the same payment costs; they are simply distributed differently. The following model provides one

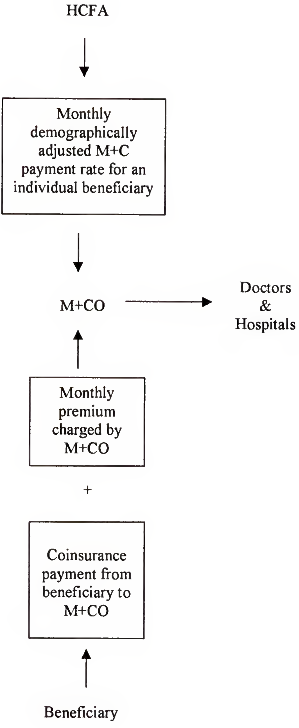
HCFA
Monthly demographically adjusted M+C payment rate for an individual beneficiary
M+CO
Doctors & Hospitals
Monthly premium charged by M+CO
+
Coinsurance payment from beneficiary to M+CO
Beneficiary

Figure 4.1
Flow of Funds Under a M+C Plan

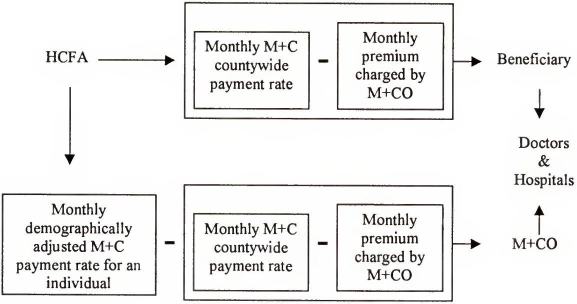
HCFA
Monthly M+C countywide payment rate
-
Monthly premium charged by M+CO
Beneficiary
Doctors & Hospitals
Monthly demographically adjusted M+C payment rate for an individual
-
Monthly M+C countywide payment rate
-
Monthly premium charged by M+CO
M+CO

Figure 4.2
Flow of Funds Under a MSA Plan

explanation for why M+COs will not offer MSA plans. The model illustrates that M+COs preference for the plan type providing greater profits is in direct conflict with the preferences of a beneficiary seeking the least costly plan. If both parties act in their own best interest, their preferences will always be contradictory. The following notation is required to prove this result formally. The non-technical reader may wish to skip the formal analysis and proceed to the concluding section where the key lessons from the model are summarized. The notation employed in the model is as follows.

b = annualized demographically adjusted M+C payment rate for an individual beneficiary (i.e., the amount the M+CO receives from HCFA over the course of a year for a specific beneficiary).

r = annualized M+C countywide payment rate; where $r \gtreqless b$.

p = annualized premium charged by the M+CO, where $0 \leq p \leq r$.

d_i = annual deductible beneficiary must pay prior to plan policy paying any or all benefits under plan i, where $i \in$ {M+C plan, MSA plan}, and $0 \leq d_i \leq \$6,000$.[7]

c_i = coinsurance beneficiary must pay for services received under plan i; $i \in$ {M+C plan, MSA plan}; $c_{M+C} = .20$; $c_{MSA} = 0$.[8]

m = annual medical expenses incurred by a beneficiary.

Π_i = annual per beneficiary profit M+CO earns under plan i; $i \in$ {M+C plan, MSA plan}

C_i = Total annual direct beneficiary cost under plan i; $i \in$ {M+C plan, MSA plan}

The M+CO and the beneficiary are risk neutral.

Under a M+C plan, the M+CO receives the beneficiary's premium payment (p) and HCFA's demographically adjusted M+C payment rate for that beneficiary (b). The M+CO must pay eighty percent of all medical expenses (m) incurred after the deductible (d_{M+C}) has been met. Therefore, the per-enrollee profit of a M+CO offering a M+C plan is given by the equation:

$$\Pi_{M+C} = [\, p + b - .80(m - d_{M+C})\,] \qquad (1)$$

Under a MSA plan, the M+CO receives HCFA's demographically adjusted M+C payment rate for that beneficiary (b) minus the lump sum amount HCFA deposited directly into the beneficiary's account (the monthly countywide payment rate minus the beneficiary's monthly premium for twelve months = (r-p)). The M+CO must pay 100 percent of all medical expenses (m) incurred after the deductible (d_{MSA}) has been met. Therefore, profit of a M+CO offering a MSA plan is given by the equation:

---

[7] The maximum allowable deductible is $6,000 per year for MSA plans. There is no minimum allowable deductible.

[8] No coinsurance is permitted with a MSA plan. For most services, the current coinsurance rate for Medicare beneficiaries under original Medicare is twenty percent.

$$\Pi_{MSA} = [\, b - (r - p) - (m - d_{MSA})\,] \tag{2}$$

A MSA plan is more profitable than a M+C plan if (2) > (1), i.e., if

$$[\, p + b - .80(m - d_{M+C})\,] < [\, b - (r - p) - (m - d_{MSA})\,]$$

$$\Rightarrow \quad -.80m + .80d_{M+C} < -r - m + d_{MSA}$$

$$\Rightarrow \quad .20m + .80d_{M+C} < -r + d_{MSA}$$

$$\Rightarrow \quad .20m + .80d_{M+C} + r < d_{MSA} \tag{3}$$

Therefore, a M+CO's profit under a MSA plan is greater than its profit under a M+C plan iff equation (3) holds.

Under a M+C plan, the beneficiary is responsible for paying the M+C plan premium (p) plus twenty percent of all medical expenses (m) incurred after the deductible (d_{M+C}) has been met, plus the deductible. Therefore, the cost incurred by a beneficiary enrolling in a M+C plan is given by the equation:

$$C_{M+C} = [\, p + .20(m - d_{M+C}) + d_{M+C}\,] \tag{4}$$

Under a MSA plan, the beneficiary is responsible for paying the deductible (d_{MSA}). He receives for use toward the deductible the lump sum HCFA deposits into his account (the monthly countywide payment rate minus his monthly premium = (r-p)). Therefore, the cost incurred by a beneficiary enrolling in a MSA plan is given by the equation:

$$C_{MSA} = [\, d_{MSA} - (r - p)\,] \tag{5}$$

A MSA plan is less costly for a beneficiary than a M+C plan if (4) > (5), i.e. if

$$[\, p + .20m - .20d_{M+C} + d_{M+C}\,] > [\, d_{MSA} - (r - p)\,]$$

$$\Rightarrow \quad .20m - .20d_{M+C} + d_{M+C} > d_{MSA} - r$$

$$\Rightarrow \quad .20m - .20d_{M+C} + d_{M+C} + r \; > \; d_{MSA}$$

$$\Rightarrow \quad .20m + .80d_{M+C} + r \; > \; d_{MSA} \qquad (6)$$

Therefore beneficiary costs under a MSA plan are less than costs under a M+C plan iff equation (6) holds.

The M+CO will prefer the most profitable plan. The beneficiary will prefer the least costly plan. Comparing equations (3) and (6), it is clear that the M+CO and the beneficiary will not prefer the same plan. For the M+CO to prefer a MSA plan, the MSA deductible must be greater than the M+C plan deductible plus twenty percent of medical expenses plus the annualized countywide payment rate. For a beneficiary to prefer the MSA plan, the MSA deductible would have to be less than this sum. Consequently, there are no instances in which it is in both the M+CO's and the beneficiary's best interest to adopt a MSA plan.

Since both M+COs and beneficiaries know the value of the countywide payment rate and the deductibles for both plans, if any party has greater knowledge of the values of the plans it is the beneficiary. The beneficiary should have greater knowledge of his health status and therefore a more accurate estimate of the costs of his medical expenses for the year. Given this knowledge, the beneficiary will select the plan that costs him the least, which is the plan that provides the M+CO a lower profit. Therefore, there is no incentive for the M+CO to offer a MSA, as it could never earn greater profits by doing so than it could earn by offering only a M+C plan.

4.4 Program Reform

While the current structure of the MSA program discourages M+COs from offering MSA plans, the program could be reformed to provide participation incentives to the

M+COs. One possible reform is the provision of an additional payment to M+COs offering a MSA plan in a county previously unserved by a MSA plan. Such a reform would be similar in nature to the bonus payment program enacted in the 1999 Balanced Budget Refinement Act. Under the bonus payment program, the M+CO that offered the first M+C plan in a previously unserved county was paid a five percent bonus payment for twelve months, followed by a three- percent bonus payment in the next twelve months. The goal was to provide an incentive to M+COs to offer M+C plans in counties that would otherwise not have a M+C option for Medicare beneficiaries.[9] A similar type of plan could be instituted for MSAs.

To provide an incentive to offer a MSA plan, M+COs would be given an additional payment of ten percent of the countywide payment rate for each beneficiary enrolled in a new MSA. Like the bonus payment program, the MSA incentive program could be restricted to MSA plans offered in counties without any current MSA plans. Such an incentive would create conditions under which both a M+CO and a beneficiary might prefer a MSA plan to a M+C plan. This result can be illustrated formally using the same notation as above.

Under the new MSA incentive program, the M+CO would receive HCFA's demographically adjusted M+C payment rate for that beneficiary (b) minus the lump sum amount HCFA deposited directly into the beneficiary's account (the monthly countywide payment rate minus the beneficiary's monthly premium for twelve months = (r-p)), plus ten percent of the annualized countywide payment rate (r). The M+CO would still pay

---

[9] The bonus payment program required plans to be offered between January 1, 2000 and December 31, 2001. The bonus was a percentage of the countywide payment rate.

100 percent of all medical expenses (m) incurred after the deductible (d_{MSA}) is met. Therefore, the profit of the M+CO offering a new MSA plan is given by the equation:

$$\Pi_{MSA} = [\, b - (r - p) - (m - d_{MSA}) + .10r] \qquad (2a)$$

A MSA plan would be more profitable than a M+C plan if (2a) > (1), i.e., if

$$[\, p + b - .80(m - d_{M+C})\,] < [\, b - (r - p) - (m - d_{MSA}) + .10r]$$

$$\Rightarrow \; -.80m + .80d_{M+C} < -r - m + d_{MSA} + .10r$$

$$\Rightarrow \; .20m + .80d_{M+C} + .9r < d_{MSA} \qquad (3a)$$

The beneficiary's incentives would not be affected by this plan. A MSA plan is less costly for a beneficiary than a M+C plan if equation (6) holds. Comparing equations (3a) and (6), it is clear that the M+CO and the beneficiary no longer have mutually exclusive preferences. For the M+CO to prefer a MSA plan, equation (3a) must hold. For the beneficiary to prefer a MSA plan, equation (6) must hold. Under the new incentive plan, these preferences are no longer incompatible.

$$.20m + .80d_{M+C} + .9r < d_{MSA} \qquad (3a)$$

$$.20m + .80d_{M+C} + r > d_{MSA} \qquad (6)$$

$$\Rightarrow \; .20m + .80d_{M+C} + .9r < d_{MSA} < .20m + .80d_{M+C} + r$$

$$\Rightarrow \; .20m + .80d_{M+C} + .9r < .20m + .80d_{M+C} + r$$

There is a set of parameters for which the M+CO will prefer to offer a MSA plan, and for which a beneficiary will accept a MSA plan. By reforming the MSA program to provide incentives to the M+CO, HCFA may be able to encourage M+COs to participate in the MSA plan and may in turn realize some of the potential benefits thought to result from the MSA program.

4.5 Conclusion

One of the goals of the Medicare+Choice Program was to provide Medicare beneficiaries with a wider range of options for Medicare managed care. The Medical Savings Account program was thought to be able to help achieve this goal by providing an alternative to traditional managed care plans. Additionally, the program allows greater flexibility in treatment options for beneficiaries since they are permitted to use their account money however they choose. There are other potential benefits to the program as well. MSA plans discourage over-utilization of services and encourage overall cost savings by making beneficiaries more aware of the costs of health care services. They might also enable HCFA to better determine costs of services within counties and thereby contribute to more accurate development of countywide payment rates. Unfortunately, the structure of the program is such that M+COs earn less profit under a MSA plan than they might otherwise earn offering a M+C plan; therefore, there are no incentives for a M+CO to participate in the MSA program. By reforming the program to include incentives to M+COs offering MSA plans, the benefits of the MSA program may yet be realized. Without reform, the MSA program will not succeed in enlisting M+COs to participate and any potential benefits of the program will be missed.

CHAPTER 5
CONCLUSION

This dissertation consists of three studies considering the effects of the 1997 BBA on Medicare managed care providers, on Medicare beneficiaries, and on total social welfare.

In Chapter 1, I develop a theoretical model to examine the effects of one element of the BBA, the UBR. I find that if M+COs face approximately the same cost structure across counties and payment rates to all counties within a service area are low, imposing the UBR generally increases welfare. However, if payment rates within a service area are disparate, M+COs have an incentive to exit a county in order to earn greater profits in another. Whenever the UBR causes a M+CO to exit a county, welfare unambiguously decreases.

Because payment rates were historically based on the cost to provide health care within a county, assuming no relationship between costs and payment rates suggests the model might not accurately reflect actual conditions. However, the degree of association between costs and payments is unclear, therefore for simplicity, either full association or no association might be assumed. Full association would eliminate the entire problem; therefore the assumption of no association was made. Further research might examine the level of discrepancy between actual costs and payments.

One additional consideration concerns the welfare implications of the model in Chapter 2. Because the model considers only two M+COs, exit unambiguously decreases welfare. It is possible that a model allowing three or more providers would not have this result. A county with a large number of providers might not be adversely affected by the exit of one provider to such a degree as to eliminate the benefits of the UBR among other counties and providers. Further research is needed to clarify the effects of the UBR in counties with more than two providers.

The UBR appears to have been an appropriate policy in that it might limit over-provision of benefits in high payment counties while improving benefits within low payment counties. However, the policy would have been more effective had it been implemented in conjunction with a comparable payment rate adjustment. As payment rates become more similar across contiguous counties, M+COs incentives to exit should decrease.

Chapter 3 considered the findings in the theoretical analysis and analyzed whether the UBR caused providers to exit. I found that exit did occur following implementation of the UBR, and that the UBR appears to have been a factor this exit. Regression analysis and the disparity in payment rates among contiguous counties with exit support this result. Regression analysis indicates that neither the new method for calculating county payment rates nor the M+C plan transition requirements caused providers to exit.

To definitively determine the cause of provider exit, it is necessary to conduct further research. Of greatest importance would be a firm-level study to determine the actual exit and entry patterns on a per-firm basis. Additionally, the specific benefits should be considered. It is possible that providers remaining in a county significantly decreased their benefits, which would affect beneficiary welfare. As of 2000, the data to analyze these changes have been recorded by HCFA so that further analysis will be possible.

It would be valuable to determine whether the UBR increased or decreased overall welfare. While counties that lost all plans after the BBA can be assumed to have lower total social welfare, it is possible that counties losing one or two plans but maintaining two or more plans saw increased total social welfare. A more detailed examination of benefits and firm-specific exit must be conducted.

Chapter 4 addressed the introduction of the MSA program. I find that the compensation scheme is such that a M+CO will always earn greater profit offering a M+C plan rather than a MSA plan. If the M+CO prefers the most profitable plan and the beneficiary prefers the least costly plan, there are no instances in which it is in both the M+COs and the beneficiary's best interest to adopt a MSA plan. While the suggested reform provides a temporary solution to this conflict (similar to another temporary solution implemented by HCFA to encourage M+CO participation) further research to develop a long-term solution (perhaps through profit-sharing) is needed. Further research might also consider the effects of asymmetric information and of risk aversion. It is possible that under certain conditions, incentives will coincide.

The M+C Program was a broad initiative that appears to have numerous benefits. Some of the benefits have been realized, for example payment rates have become less disparate among contiguous counties. Other potential benefits require additional reforms to become feasible, for example those benefits available through the MSA program. Still other potential benefits require further research to completely evaluate. These research efforts might concentrate on the UBR and other methods of expanding Medicare managed care options to all Medicare beneficiaries and specifically those beneficiaries residing in rural, traditionally low payment counties.

APPENDIX A
PROOFS AND LEMMAS FOR CHAPTER 2

Appendix A.1. This appendix contains formal proofs of Lemmas 1 through 6, Proposition 1, and Corollaries 1 through 3 found within Chapter 2.

Proof of Lemma 1: The high cost M+CO will not operate (i.e., $q_2^k = 0 \; \forall \; k \in \{L, H\}$) in either county if the uniform benefits requirement is not imposed.

1) Suppose the uniform benefits requirement is not imposed.

   By assumption, $C_1^k(\theta) < C_2^k(\theta) \; \forall \; \theta \geq \theta_0, \; k \in \{L, H\}$, and

   $[R^L - C_2(\theta)] < 0 \; \forall \; \theta \geq \theta_0.$

2) Suppose $[R^k - C_1(\theta_0)] > 0, \; k \in \{L, H\}$. By assumption, $C_1(\theta_0) < C_2(\theta) \; \forall \; \theta > \theta_0.$

   $\Rightarrow \quad [R^k - C_1(\theta_0)]n^k > [R^k - C_1(\theta_{\sim 0})]n^k, \; k \in \{L, H\}$

   $\Rightarrow \quad \Pi_1^k(\theta_0) > \Pi_1^k(\theta_{\sim 0}), \; k \in \{L, H\}$ (A1.1)

3) Since $[R^L - C_2(\theta_0)] < 0$, M+CO$_2$ will not enter county L. By offering the minimum possible benefits (θ_0) in county L, M+CO$_1$ can serve all enrollees (n^L) in county L. (A1.1) reveals that M+CO$_1$ maximizes profit by offering θ_0 in county L.

4) From (A1.1), M+CO$_1$'s profits are greatest when offering basic benefits to all enrollees in a county. Therefore, M+CO$_1$ will maximize profit by offering the minimum benefits, subject to ensuring it captures the county.

   By assumption, $q_2^L = 0$ since $[R^L - C_2(\theta)] < 0 \; \forall \; \theta \geq \theta_0.$

By assumption, demand ≡ $q_1^H = 0$ if $\theta_1^H < \theta_2^H$

n^H if $\theta_1^H \geq \theta_2^H$

5) Suppose there exists some $\theta^{\sim}$ such that $[R^H - C_2(\theta^{\sim})] = 0$.

$\Rightarrow \quad [R^H - C_1(\theta^{\sim})] > 0$.

Then M+CO$_1$ offers all enrollees in county H benefits $\theta_1^{\sim} = \theta_2^{\sim}$, and serves all enrollees in county H: $q_1^H = n^H$. (A1.2)

6) Suppose M+CO$_1$ offers benefits $\theta_1^{\sim} + \varepsilon > \theta_1^{\sim}$.

Since $C_1(\theta_1^{\sim}) < C_1(\theta_1^{\sim} + \varepsilon)$, profits are lower when M+CO$_1$ offers $\theta_1^{\sim} + \varepsilon$ than if M+CO$_1$ offers $\theta_1^{\sim}$, (i.e. $[R^H - C_1(\theta_1^{\sim})]n^H > [R^H - C_1(\theta_1^{\sim} + \varepsilon)]n^H$)

$\Rightarrow \quad \Pi_1^H(\theta_1^{\sim}) > \Pi_1^H(\theta_1^{\sim} + \varepsilon)$.

M+CO$_1$ has no incentive to offer benefits greater than $\theta_1^{\sim} = \theta_2^{\sim}$ where $\theta_2^{\sim}$ solves $R^H = C_2(\theta^{\sim})$. M+CO$_1$ serves all enrollees in county H benefits $\theta_1^{\sim}$ and M+CO$_2$ will not operate. If M+CO$_1$ offers $\theta_1^{\sim} < \theta_2^{\sim}$, it does not serve any enrollees, and $q_1^H = 0$.

$\Rightarrow \quad [R^H - C_1(\theta_1^{\sim})]n^H > [R^H - C_1(\theta_1^{\sim} - \varepsilon)](0)$

$\Rightarrow \quad \Pi_1^H(\theta_1^{\sim}) > 0$.

M+CO$_1$ has no incentive to offer fewer benefits than $\theta_1^{\sim}$. By symmetry, if there exists some θ such that $[R^L - C_2(\theta)] > 0$, M+CO$_1$ would offer in county L that level of benefits such that $R^L = C_2(\theta)$. Therefore, the result can be generalized such that M+CO$_1$ is able to capture both counties L and H.

7) Since $[R^L - C_1(\theta_0)]n^L \geq 0$ and $[R^H - C_1(\theta^{\sim})]n^H \geq 0$,

$[R^L - C_1(\theta_0)]n^L + [R^H - C_1(\theta^{\sim})]n^H \geq [R^L - C_1(\theta_0)]\,(0) + [R^H - C_1(\theta^{\sim})]n^H$ and

$[R^L - C_1(\theta_0)]n^L + [R^H - C_1(\theta^{\sim})]n^H \geq [R^L - C_1(\theta_0)]\, n^L + [R^H - C_1(\theta^{\sim})](0)$

$\Rightarrow \quad \Pi_1^{H+L} > \Pi_1^H$ and $\Pi_1^{H+L} > \Pi_1^L$.

M+CO$_1$ earns greater profit operating in both counties than in only one county; therefore, M+CO$_1$ serves all enrollees in both counties and M+CO$_2$ does not operate.

Proof of Lemma 2: Suppose the high cost M+CO can profitably operate in county H. Then the low cost M+CO will not offer uniform benefits in counties L and H if the uniform benefits requirement is not imposed.

By Lemma 1, M+CO$_1$ maximizes its profit in county L by offering minimum benefits (θ_0) to all enrollees in county L, and M+CO$_1$ maximizes its profit in county H by offering benefits θ_1^H to all enrollees in county H.

Suppose $R^H = C_2(\theta)$ for $\theta > \theta_0$.

Then M+CO$_1$ offers θ_0 in county L and $\theta > \theta_0$ in county H

$\Rightarrow \quad \theta_1^L < \theta_1^H$.

Proof of Lemma 3: The low cost M+CO will serve all enrollees in both counties when the uniform benefits requirement is imposed if and only if (C1) and (C2) hold.

1) In the proof of Lemma 1, (A1.2) reveals that M+CO$_1$ maximizes profits in county H by offering $\theta^{\sim}$ where $\theta^{\sim}$ solves $[R^H - C_2(\theta^{\sim})] = 0$. This is the maximum level of benefits M+CO$_2$ can profitably offer in county H. By Lemma 1, M+CO$_1$ maximizes profits in county L by offering θ_0.

$\Rightarrow \quad \Pi_1^H = [R^H - C_1(\theta_1^{\sim})]n^H \qquad$ (A1.3)

$\Rightarrow \quad \Pi_1^L = [R^L - C_1(\theta_0)]n^L \qquad$ (A1.4)

2) Suppose the UBR is imposed. $M+CO_1$ can exit one, both, or neither county. If $M+CO_1$ offers $\theta^{\sim}$ in county H, it must also offer $\theta^{\sim}$ in county L.

$$\Pi_1^{L+H} = [R^H - C_1(\theta_1^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L. \tag{A1.5}$$

If (A1.5) > (A1.3), $\Pi_1^{L+H} > \Pi_1^H$.

It is more profitable for $M+CO_1$ to offer all enrollees in both counties benefits $\theta^{\sim}$ than to offer benefits $\theta^{\sim}$ in county H only.

$$\Rightarrow \qquad [R^H - C_1(\theta_1^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^H - C_1(\theta_1^{\sim})]n^H \tag{C1}$$

If (A1.5) > (A1.4), $\Pi_1^{L+H} > \Pi_1^L$.

It is more profitable for $M+CO_1$ to offer all enrollees in both counties benefits $\theta^{\sim}$ than to offer benefits θ_0 in county L only.

$$\Rightarrow \qquad [R^H - C_1(\theta_1^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^L - C_1(\theta_0)]n^L \tag{C2}$$

Therefore, $M+CO_1$ will serve all enrollees in both counties when UBR is imposed if (C1) and (C2) hold.

If (A1.5) < (A1.3), $M+CO_1$ will exit county H.

If (A1.5) < (A1.4), $M+CO_1$ will exit county L.

Proof of Proposition 1: When the UBR is imposed, welfare increases if and only if conditions (C1) – (C3) hold.

Conditions (C1) and (C2) ensure $M+CO_1$ offers all enrollees in both counties L and H benefits $\theta^{\sim}$. Welfare when the UBR is imposed is the sum of enrollees' total utility, and $M+CO_1$'s profit in counties L and H.

$$W^U = [U(\theta^{\sim}) - R^H]n^H + [U(\theta^{\sim}) - R^L]n^L + [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L.$$

$$W^U = U(\theta^{\sim})n^H + U(\theta^{\sim})n^L - C_1(\theta^{\sim})n^H - C_1(\theta^{\sim})n^L. \tag{A1.6}$$

By assumption, $[R^L - C_2(\theta_0)]n^L < 0$. M+CO$_1$ will offer only the minimum benefits in county L if the UBR is not imposed. Welfare without the UBR imposed is the sum of enrollees' total utility, and M+CO$_1$'s profit in counties L and H.

$$W^N = [U(\theta^{\sim}) - R^H]n^H + [U(\theta_0) - R^L]n^L + [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta_0)]n^L.$$

$$W^N = U(\theta^{\sim})n^H + U(\theta_0)n^L - C_1(\theta^{\sim})n^H - C_1(\theta_0)n^L. \tag{A1.7}$$

From (A1.6) and (A1.7), $W^U > W^N$ as

$$U(\theta^{\sim})n^H + U(\theta^{\sim})n^L - C_1(\theta^{\sim})n^H - C_1(\theta^{\sim})n^L > U(\theta^{\sim})n^H + U(\theta_0)n^L - C_1(\theta^{\sim})n^H - C_1(\theta_0)n^L$$

$$\Rightarrow \quad U(\theta^{\sim})n^L - C_1(\theta^{\sim})n^L > U(\theta_0)n^L - C_1(\theta_0)n^L.$$

$$\Rightarrow \quad U(\theta^{\sim}) - C_1(\theta^{\sim}) > U(\theta_0) - C_1(\theta_0). \tag{A1.8}$$

(A1.8) reveals that $W^U > W^N$ if and only if

$U(\theta^{\sim}) - C_1(\theta^{\sim}) > U(\theta_0) - C_1(\theta_0)$, or

$$U(\theta^{\sim}) - U(\theta_0) > C_1(\theta^{\sim}) - C_1(\theta_0). \tag{C3}$$

Lemma 4: Suppose conditions (C1) and (C2) hold, but (C3) does not hold. Then imposing the uniform benefits requirement does not increase welfare.

Conditions (C1) and (C2) ensure M+CO$_1$ operates in both counties; it is more profitable for M+CO$_1$ to operate in counties L and H offering benefits $\theta^{\sim}$ than to operate only in county L or only in county H. If (C3) does not hold, the cost of increasing benefits from θ_0 to $\theta^{\sim}$ is greater than the utility enrollees receive from those additional benefits (i.e., $U(\theta^{\sim}) - U(\theta_0) < C_1(\theta^{\sim}) - C_1(\theta_0)$). Therefore, although M+CO$_1$ serves both counties H and L and provides enrollees in county L greater benefits than without the UBR, total welfare is lower with the UBR than without the UBR.

From (A1.6) and (A1.7), we know that $W^U > W^N$ as

$$\Rightarrow \quad U(\theta^{\sim}) - C_1(\theta^{\sim}) > U(\theta_0) - C_1(\theta_0). \qquad \text{(A1.8)}$$

(A1.8) reveals that $W^U > W^N$ if and only if

$$\Rightarrow \quad U(\theta^{\sim}) - U(\theta_0) > C_1(\theta^{\sim}) - C_1(\theta_0). \qquad \text{(C3)}$$

Therefore if (C3) does not hold, the UBR does not increase welfare.

Lemma 5: Suppose condition (C2) holds and (C1) does not hold. Then welfare decreases when the UBR is imposed.

By (C1) it is more profitable for M+CO$_1$ to operate in both counties than only in county H; by (C2) it is more profitable for M+CO$_1$ to operate in both counties than only in county L.

$$[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^H - C_1(\theta^{\sim})]n^H \Rightarrow$$

$$[R^L - C_1(\theta^{\sim})]n^L \geq 0, \text{ and} \qquad \text{(C1)}$$

$$[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^L - C_1(\theta_0)]n^L \qquad \text{(C2)}$$

If (C2) holds and (C1) does not hold,

$$[R^H - C_1(\theta^{\sim})]n^H \geq [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^L - C_1(\theta_0)]n^L.$$

The low cost M+CO will serve the high payment county and neither M+CO will serve the low payment county.

If M+CO$_1$ exits county L and operates only in county H, welfare is unambiguously lower than without the UBR. The low payment county is not served by either M+CO, since by assumption M+CO$_2$ cannot profitably operate in county L, and M+CO$_1$ exits county L to earn greater profits operating in county H only. Enrollees' benefits in county H remain unchanged at $\theta^{\sim}$ when the UBR is imposed.

Welfare is the sum of enrollees' total utility and M+CO$_1$'s profit in county H.

$W^U = [U(\theta^{\sim}) - R^H]n^H + [R^H - C_1(\theta^{\sim})]n^H.$

$$W^U = U(\theta^{\sim})n^H - C_1(\theta^{\sim})n^H. \qquad \text{(A1.9)}$$

Without the UBR, M+CO$_1$ provides county L benefits θ_0 and provides county H benefits $\theta^{\sim}$. Welfare is the sum of enrollees' total utility and M+CO$_1$'s profits in counties L and H.

$W^N = [U(\theta^{\sim}) - R^H]n^H + [U(\theta_0) - R^L]n^L + [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta_0)]n^L.$

$$W^N = U(\theta^{\sim})n^H + U(\theta_0)n^L - C_1(\theta^{\sim})n^H - C_1(\theta_0)n^L. \qquad \text{(A1.10)}$$

From (A1.9) and (A1.10), $W^U \oplus W^N$ as

$U(\theta^{\sim})n^H - C_1(\theta^{\sim})n^H \oplus U(\theta^{\sim})n^H + U(\theta_0)n^L - C_1(\theta^{\sim})n^H - C_1(\theta_0)n^L$

$$\Rightarrow \quad 0 \oplus U(\theta_0) - C_1(\theta_0). \qquad \text{(A1.11)}$$

By assumption, $U(\theta_0) \geq C_1(\theta_0)$. (A1.11) reveals that if $U(\theta_0) - C_1(\theta_0) > 0$, imposing the UBR decreases welfare. If $U(\theta_0) = C_1(\theta_0)$, imposing the UBR has no effect on total social welfare.

Lemma 6: Suppose condition (C1) holds and (C2) does not hold. Then welfare decreases when the UBR is imposed.

By (C1) it is more profitable for M+CO$_1$ to operate in both counties than only in county H; by (C2) it is more profitable for M+CO$_1$ to operate in both counties than only in county L.

$[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^H - C_1(\theta^{\sim})]n^H \Rightarrow$

$$[R^L - C_1(\theta^{\sim})]n^L \geq 0, \text{ and} \qquad \text{(C1)}$$

$$[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^L - C_1(\theta_0)]n^L \qquad \text{(C2)}$$

If (C1) holds and (C2) does not hold,

$[R^L - C_1(\theta_0)]n^L \geq [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^H - C_1(\theta^{\sim})]n^H.$

The low cost M+CO will serve the low payment county and the high cost M+CO will serve the high payment county.

If $M+CO_1$ exits county H and operates only in county L, welfare is unambiguously lower than without the UBR. Enrollees in both counties L and H receive the same level of benefits as they would receive without the UBR imposed, however the high cost M+CO provides benefits in county H, rather than the low cost M+CO providing benefits. This means the less efficient M+CO operates where the more efficient would otherwise operate if the UBR is not imposed. This increase in total cost to provide benefits results in a decrease in total welfare.

Welfare with the UBR imposed is the sum of enrollees' total utility, $M+CO_1$'s profit in county L and $M+CO_2$'s profit in county H.

$$W^U = [U(\theta^{\sim}) - R^H]n^H + [U(\theta_0) - R^L]n^L + [R^H - C_2(\theta^{\sim})]n^H + [R^L - C_1(\theta_0)]n^L.$$

$$W^U = U(\theta^{\sim})n^H + U(\theta_0)n^L - C_2(\theta^{\sim})n^H - C_1(\theta_0)n^L. \qquad (A1.12)$$

Welfare without the UBR imposed is the sum of enrollees' total utility and $M+CO_1$'s profit in counties L and H.

$$W^N = [U(\theta^{\sim}) - R^H]n^H + [U(\theta_0) - R^L]n^L + [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta_0)]n^L.$$

$$W^N = U(\theta^{\sim})n^H + U(\theta_0)n^L - C_1(\theta^{\sim})n^H - C_1(\theta_0)n^L. \qquad (A1.13)$$

From (A1.12) and (A1.13), $W^U > W^N$ as $- C_2(\theta^{\sim}) > - C_1(\theta^{\sim})$ (A1.14)

(A1.14) reveals that since $M+CO_2$'s cost to provide any given level of benefits is higher than $M+CO_1$'s cost to provide that level of benefits, welfare is greater without the UBR imposed.

Proof of Corollary 1: Suppose conditions (C1) and (C2) hold. Then when the UBR is imposed, welfare will increase if the competitive level of benefits ($\theta^{\sim}$) is no greater than the welfare maximizing level of benefits (θ^*).

1) Suppose (C1) and (C2) hold.

By Proposition 1, imposing the UBR increases welfare if the competitive level of benefits satisfies (C3). Define θ^{χ} to be the level of benefits at which $U(\theta^{\chi}) - U(\theta_0) = C_1(\theta^{\chi}) - C_1(\theta_0)$, $\theta_0 \neq \theta^{\chi}$. θ^{χ} is the level of benefits at which (C3) becomes an equality and welfare neither increases nor decreases with the UBR.

2) By assumption, utility $U(\theta)$ is an increasing, concave function and cost $C(\theta)$ is an increasing linear function. By definition, θ^* maximizes $U(\theta) - C_1(\theta)$, since θ^* solves $U_\theta(\theta) - C_\theta(\theta)$.

$\Rightarrow \quad U(\theta^*) - C(\theta^*) > U(\theta^{\sim*}) - C(\theta^{\sim*})$.

If $U(\theta^{\chi}) - U(\theta_0) = C_1(\theta^{\chi}) - C_1(\theta_0)$, then, $U(\theta^{\chi}) - C_1(\theta^{\chi}) = U(\theta_0) - C_1(\theta_0)$.

$\Rightarrow \quad U(\theta_0) - C_1(\theta_0) < U(\theta^*) - C(\theta^*)$ and $U(\theta^{\chi}) - C(\theta^{\chi}) < U(\theta^*) - C(\theta^*)$.

3) By definition, $U(\theta_0) - C_1(\theta_0) = U(\theta^{\chi}) - C(\theta^{\chi})$, but $\theta_0 \neq \theta^{\chi}$.

$\Rightarrow \quad \theta^{\chi} > \theta^*$, due to the properties of the utility and cost functions.

4) Since any competitive level of benefits $\theta^{\sim} < \theta^{\chi}$ results in an increase in welfare when the UBR is imposed, and $\theta^* < \theta^{\chi}$, θ^* results in an increase in welfare when the UBR is imposed.

Proof of Corollary 2: Suppose the difference in M+COs' costs as defined by $C_1(\theta^{\sim}) - C_2(\theta^{\sim})$ is sufficiently small. Then M+CO$_1$ will offer basic benefits (θ_0) in the competitive equilibrium.

By (C2), M+CO$_1$ can profitably offer benefits $\theta^{\sim}$ in county L: $R^L - C_1(\theta^{\sim}) \geq 0$.

By assumption, $R^L - C_2(\theta_0) < 0$.

$\Rightarrow \quad R^L - C_1(\theta^{\sim}) \geq 0 > R^L - C_2(\theta_0)$.

$\Rightarrow \quad R^L - C_1(\theta^{\sim}) > R^L - C_2(\theta_0)$.

$\Rightarrow \quad - C_1(\theta^{\sim}) > - C_2(\theta_0)$.

Assume $C_1(\theta) = \alpha + c\theta$

$C_2(\theta) = \beta + c\theta$

Let $\beta = \alpha + \varepsilon$ where $\varepsilon > 0$ is small, so that the difference in M+COs' costs at any particular θ is small.

$\Rightarrow \quad - (\alpha + c\theta^{\sim}) > - (\alpha + \varepsilon + c\theta_0.)$

$\Rightarrow \quad - c\theta^{\sim} \quad > - c\theta_0 - \varepsilon$

$\Rightarrow \quad - \theta^{\sim} \quad > - \theta_0 - \varepsilon/c$

$\Rightarrow \quad \theta^{\sim} \quad < \theta_0 + \varepsilon/c$

If $\theta^{\sim} < \theta_0 + \varepsilon/c$, and $R^H - C_2(\theta^{\sim}) = 0$, then $R^H - C_2(\theta_0 + \varepsilon/c) < 0$. M+CO$_2$ cannot profitably provide benefits greater than basic benefits θ_0. M+CO$_1$ provides $\theta^{\sim} = \theta_0 + \varepsilon/c$.

When the difference in M+COs' costs is sufficiently small, the difference in payment rates must also be small for equilibrium to exist. This results in benefits offered sufficiently close to θ_0.

Proof of Corollary 3: Suppose the difference in payment rates is greater than the difference in costs as defined by $C_1(\theta^{\sim}) - C_2(\theta^{\sim})$. Then imposing the UBR will decrease welfare.

The difference in payment rates in counties L and H must be less than or equal to the difference in M+COs' costs as defined by $C_1(\theta^{\sim}) - C_2(\theta^{\sim})$. When conditions (C1) and (C2) hold, $M+CO_1$ offers benefits $\theta^{\sim}$ to all enrollees in both counties.

Given the assumption $C_2(\theta) = [\beta_2 + c\theta]$.

Then $R^H = \beta_2 + c\theta^{\sim}$ in the competitive equilibrium. (A1.15)

Solving (A1.15) for $\theta^{\sim}$ provides $\theta^{\sim} = (R^H - \beta_2)/c$.

By (C1), $R^L \geq C_1(\theta^{\sim})$

$\Rightarrow \quad R^L \geq \beta_1 + c\theta^{\sim}$ since $C_1(\theta) = \beta_1 + c\theta^{\sim}$

$\Rightarrow \quad R^L \geq \beta_1 + c(R^H - \beta_2)/c$.

$\Rightarrow \quad R^L \geq \beta_1 + R^H - \beta_2$.

$\Rightarrow \quad R^L - R^H \geq \beta_1 - \beta_2$.

$\Rightarrow \quad \beta_2 - \beta_1 \geq R^H - R^L$ in the competitive equilibrium. (A1.16)

Equation (A1.16) implies that the competitive equilibrium will exist only when the difference in M+COs' costs is at least as great as the difference in payments to counties H and L. Therefore, as the difference in M+COs' costs decreases, the difference in payments to counties H and L must decrease for the equilibrium to exist. By Lemma 5 and Lemma 6, if the competitive equilibrium does not exist, welfare decreases when the UBR is imposed.

Appendix A.2. This appendix addresses the effect of relaxing various assumptions held throughout the model presented in Chapter 2, and provides details regarding the welfare maximizing level of benefits.

Assertion: The assumption $C_i^L(\theta) = C_i^H(\theta)\ \forall\ \theta,\ i = 1,2$ simplifies the model. Qualitative results remain the same as if it is assumed that $C_i^L(\theta) < C_i^H(\theta)\ \forall\ \theta,\ i = 1,2$.

If an equilibrium in which M+CO$_1$ serves both counties H and L exists when the cost to provide a particular level of benefits is the same across counties, an equilibrium in which M+CO$_1$ serves both counties H and L also exists when the cost to provide a particular level of benefits differs across counties.

Suppose $C_i^L(\theta) = C_i^H(\theta)\ \forall\ \theta,\ i = 1,2$. Conditions for equilibrium in which M+CO$_1$ operates in both counties are that the profit M+CO$_1$ earns in the low payment county when it serves all enrollees (n^L) benefits $\theta^{\sim}$ must be non-negative, and the profit M+CO$_1$ earns by offering all enrollees in both counties benefits $\theta^{\sim}$ must be greater than the profit M+CO$_1$ earns by offering basic benefits to all enrollees in the low payment county only.

$$[R^L - C_1(\theta^{\sim})]n^L \geq 0, \text{ and} \tag{C1}$$

$$[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L \geq [R^L - C_1(\theta_0)]n^L \tag{C2}$$

By (C1) it is more profitable for M+CO$_1$ to operate in both counties than only in county H; by (C2) it is more profitable for M+CO$_1$ to operate in both counties than only in county L. If (C1) and (C2) are met, M+CO$_1$ serves all enrollees in both counties benefits $\theta^{\sim}$.

1) Suppose there exists some $C^{\wedge}_1(\theta) < C_1(\theta)\ \forall\ \theta$, where $C^{\wedge}_1(\theta)$ is the cost of providing benefits to consumers in the low payment county.

Since $C^{\wedge}_1(\theta) < C_1(\theta)$, then $[R^L - C_1(\theta^{\sim})]n^L < [R^L - C^{\wedge}_1(\theta)]n^L$.

If $[R^L - C_1(\theta^{\sim})]n^L \geq 0$, then $[R^L - C^{\wedge}_1(\theta)]n^L \geq 0$.

This implies that if $[R^L - C_1(\theta^{\sim})]n^L \geq 0$ satisfies (C1), then $[R^L - C^{\wedge}{}_1(\theta)]n^L \geq 0$ satisfies (C1).

2) Suppose $C_1(\theta^{\sim}) > C_1(\theta_0)$ when $(\theta^{\sim}) > (\theta_0)$. Then $C^{\wedge}{}_1(\theta^{\sim}) > C^{\wedge}{}_1(\theta_0)$. Therefore, if $[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L - [R^L - C_1(\theta_0)]n^L \geq 0$, then

$[R^H - C_1(\theta^{\sim})]n^H + [R^L - C^{\wedge}{}_1(\theta^{\sim})]n^L - [R^L - C^{\wedge}{}_1(\theta_0)]\, n^L \geq 0$.

This implies that if $[R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim})]n^L - [R^L - C_1(\theta_0)]n^L \geq 0$ satisfies (C2), then $[R^H - C_1(\theta^{\sim})]n^H + [R^L - C^{\wedge}{}_1(\theta^{\sim})]n^L - [R^L - C^{\wedge}{}_1(\theta_0)]\, n^L \geq 0$ satisfies (C2).

If an equilibrium exists in which M+CO$_1$ operates in both counties H and L under UBR when $C_1{}^L(\theta) = C_1{}^H(\theta)$., an equilibrium will also exist in which M+CO$_1$ operates in both counties H and L under UBR if $C_1{}^L(\theta) < C_1{}^H(\theta)$.

Consider $C^{\wedge}{}_1(\theta) < C_1(\theta)\ \forall\ \theta$.

Let $C^{\wedge}{}_1(\theta) = C_1(\theta) - \tau$

If $R^L - C_1(\theta) \geq 0$, then $R^L - [C^{\wedge}{}_1(\theta) + \tau] \geq 0$.

$\Rightarrow \quad R^L \geq C^{\wedge}{}_1(\theta) + \tau$.

The existence of a cost curve $C_i^L(\theta) < C_i^H(\theta)$ provides the same results regarding equilibria as giving a lump sum payment to M+CO$_1$ for serving county L: $R^L + \tau$. It encourages M+CO$_1$ to remain in county L.

Since by assumption M+CO$_2$ cannot profitably operate in county L, M+CO$_2$'s only cost curve represents costs in county H. M+CO$_1$ offers benefits based on M+CO$_2$'s maximum profitable level of benefits, regardless of whether M+CO$_1$

faces separate cost curves for county L and H (i.e., if $C_i^L(\theta) < C_i^H(\theta)$) or if costs are the same ($C_i^L(\theta) = C_i^H(\theta)$).[1]

Condition (C3) is not affected, since the comparison of welfare with and without the UBR depends only on enrollees' utility and M+COs' costs of providing benefits in county L: $U(\tilde{\theta})n^L - U(\theta_0)n^L > C_1(\tilde{\theta})n^L - C_1(\theta_0)n^L$.

Assertion: The assumption $[R^L - C_2(\theta)]n^L < 0 \ \forall\ \theta \geq \theta_0$ provides the same qualitative results as are found if it is assumed that there exists some θ such that $[R^L - C_2(\theta)]n^L > 0$.

This proof proceeds by considering three distinct cases, labeled A, B, and C.

Case A) In the situation in which (C1) and (C2) hold, the assumption $[R^L - C_2(\theta)]n^L < 0$ for all θ does not affect the results.

1) Suppose $[R^L - C_2(\theta)]n^L < 0$ for all θ.

Further suppose (C1) and (C2) hold. This assumption will be maintained throughout Case A. M+CO$_1$ earns greater profit offering $\tilde{\theta}$ in counties H and L than it can earn operating in only county H or only county L.

$$\Rightarrow \quad R^H n^H - C_1(\tilde{\theta})n^H + R^L n^L - C_1(\tilde{\theta})n^L \geq R^H n^H - C_1(\tilde{\theta})n^H \qquad \text{(A2.1)}$$

$$\Rightarrow \quad R^H n^H - C_1(\tilde{\theta})n^H + R^L n^L - C_1(\tilde{\theta})n^L \geq R^L n^L - C_1(\theta_0)n^L \qquad \text{(A2.2)}$$

M+CO$_1$ operates in both counties H and L; M+CO$_2$ does not operate. By Lemma 4, total social welfare increases iff (C3) holds.[2]

2) Suppose there exists some θ for which $R^L - C_2(\theta) \geq 0$.

---

[1] If M+CO$_2$ can profitably operate in county L ($[R^L - C_2(\theta_0)]n^L \geq 0$), the parameters in conditions (C1)-(C3) change, however the determination of welfare based on those parameters remains the same as when M+CO$_2$ cannot profitably operate in county L ($[R^L - C_2(\theta_0)]n^L < 0$).

[2] See proof of Lemma 4.

To capture county L, M+CO$_1$ must offer the level of benefits that satisfies R^L - $C_2(\theta) = 0$. Let $\theta^{\sim L}$ solve R^L - $C_2(\theta) = 0$. Since $R^H > R^L$ and $C_1^H(\theta) = C_1^L(\theta)$, the level of benefits M+COs can profitably offer is greater in county H than in county L: $\theta^{\sim} > \theta^{\sim L}$.

Therefore, to capture both counties, M+CO$_1$ must offer $\theta^{\sim}$. Condition (C1) = (A2.1) is unchanged; condition (C2) = (A2.2) becomes

$$R^H n^H - C_1(\theta^{\sim})n^H + R^L n^L - C_1(\theta^{\sim})n^L \geq R^L n^L - C_1(\theta^{\sim L})n^L \tag{A2.3}$$

If (A2.1) and (A2.3) hold, M+CO$_1$ offers benefits $\theta^{\sim}$ to all enrollees in both counties and M+CO$_2$ is unable to operate. By Lemma 4, total social welfare increases iff (C3) holds.

Case B) In the situation in which (C2) holds and (C1) does not, the assumption $[R^L - C_2(\theta)]n^L < 0 \ \forall \ \theta$ does not affect the results.

1) Suppose $[R^L - C_2(\theta)]n^L < 0 \ \forall \ \theta$.

Further suppose (C2) holds and (C1) does not hold. This assumption will be maintained throughout Case B. M+CO$_1$ earns greater profit offering $\theta^{\sim}$ in county H alone than it can earn offering $\theta^{\sim}$ in counties H and L; however, offering $\theta^{\sim}$ in counties H and L is more profitable than offering basic benefits in county L only.

$$\Rightarrow \quad R^H n^H - C_1(\theta^{\sim})n^H \geq R^H n^H - C_1(\theta^{\sim})n^H + R^L n^L - C_1(\theta^{\sim})n^L \geq R^L n^L - C_1(\theta_0)n^L \tag{A2.4}$$

$$\Rightarrow \quad R^H n^H - C_1(\theta^{\sim})n^H \geq R^L n^L - C_1(\theta_0)n^L \tag{A2.5}$$

M+CO$_1$ operates only in county H; M+CO$_2$ does not enter either county. By Lemma 5, total social welfare decreases.[3]

2) Suppose there exists some θ for which $R^L - C_2(\theta) \geq 0$.

Since (A2.5) holds, M+CO$_1$ operates only in county H. However, since by assumption it is profitable to do so, M+CO$_2$ operates in county L and provides benefits θ_0. Total social welfare decreases.

If there exists a θ for which $R^L - C_2(\theta) = 0$, that θ becomes the benchmark by which M+CO$_1$ makes its participation decision. Substituting θ for θ_0 in equation (A2.5) M+CO$_1$ will operate only in county H if $R^H n^H - C_1(\theta^{\sim})n^H \geq R^L n^L - C_1(\theta)n^L$.

Let $\theta^{\sim L}$ solve $R^L - C_2(\theta) = 0$. Welfare under the UBR is the sum of enrollees' total utility in counties L and H, M+CO$_1$'s profit in county H, and M+CO$_2$'s profit in county L.

$$W^U = [U(\theta^{\sim}) - R^H]n^H + [U(\theta_0) - R^L]n^L + [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_2(\theta^{\sim L})]n^L.$$

$$W^U = U(\theta^{\sim})n^H + U(\theta_0)n^L - C_1(\theta^{\sim})n^H - C_2(\theta^{\sim L})n^L. \qquad \text{(A2.6)}$$

Welfare without the UBR imposed is the sum of enrollees' total utility in counties L and H, and M+CO$_1$'s profit in counties L and H.

$$W^N = [U(\theta^{\sim}) - R^H]n^H + [U(\theta^{\sim L}) - R^L]n^L + [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim L})]n^L.$$

$$W^N = U(\theta^{\sim})n^H + U(\theta^{\sim L})n^L - C_1(\theta^{\sim})n^H - C_1(\theta^{\sim L})n^L. \qquad \text{(A2.7)}$$

From (A2.6) and (A2.7), $W^U \oplus W^N$ as

$$U(\theta^{\sim})n^H + U(\theta^{\sim L})n^L - C_1(\theta^{\sim})n^H - C_2(\theta^{\sim L})n^L \oplus U(\theta^{\sim})n^H + U(\theta^{\sim L})n^L - C_1(\theta^{\sim})n^H - C_1(\theta^{\sim L})n^L$$

---

[3] See proof of Lemma 5.

$$\Rightarrow \quad - C_2(\theta^{\sim L}) \oplus - C_1(\theta^{\sim L}) \tag{A2.8}$$

(A2.8) reveals that since $C_2(\theta) > C_1(\theta)$ for all θ, welfare decreases when the UBR is imposed. The less efficient M+CO provides benefits to county L, and the level of benefits in both counties L and H is the same as is provided without the UBR. Without the UBR, M+CO$_1$ serves county H benefits $\theta^{\sim}$, and serves county L benefits $\theta^{\sim L}$, where $\theta^{\sim L}$ solves $[R^L = C_2(\theta)]$. Because by assumption consumers choose the low cost M+CO when indifferent, M+CO$_1$ offers that level of benefits at which $[R^L = C_2(\theta)]$.

Case C) In the situation in which (C1) holds and (C2) does not, the assumption $[R^L - C_2(\theta)]n^L < 0 \ \forall \ \theta$ does not affect the results.

1) Suppose $[R^L - C_2(\theta)]n^L < 0 \ \forall \ \theta$.

Further suppose (C1) holds and (C2) does not hold. This assumption will be maintained throughout Case C. M+CO$_1$ earns greater profit offering θ_0 in county L alone than it can earn offering $\theta^{\sim}$ in counties H and L; however, offering $\theta^{\sim}$ in counties H and L is more profitable than offering $\theta^{\sim}$ in county H only.

$$\Rightarrow \quad R^L n^L - C_1(\theta_0)n^L \geq R^H n^H - C_1(\theta^{\sim})n^H + R^L n^L - C_1(\theta^{\sim})n^L \geq R^H n^H - C_1(\theta^{\sim})n^H \tag{A2.9}$$

$$\Rightarrow \quad R^L n^L - C_1(\theta_0)n^L \geq R^H n^H - C_1(\theta^{\sim})n^H \tag{A2.10}$$

M+CO$_1$ operates only in county L; M+CO$_2$ operates in county H. By Lemma 6, total social welfare decreases.[4]

2) Suppose there exists some θ for which $R^L - C_2(\theta) \geq 0$.

---

[4] See proof of Lemma 6.

$M+CO_1$ is no longer able to capture county L offering θ_0. Instead, $M+CO_1$ must offer the level of benefits that satisfies $R^L - C_2(\theta) = 0$. Let $\theta^{\sim L}$ solve this equation. By substituting $\theta^{\sim L}$ for θ_0 in equation (A2.10), $M+CO_1$ will operate only in county L if $R^L n^L - C_1(\theta^{\sim L})n^L \geq R^H n^H - C_1(\theta^{\sim})n^H$.

Welfare under the UBR is the sum of enrollees' total utility in counties L and H, $M+CO_1$'s profit in county L, and $M+CO_2$'s profit in county H.

$$W^U = [U(\theta^{\sim}) - R^H]n^H + [U(\theta^{\sim L}) - R^L]n^L + [R^H - C_2(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim L})]n^L.$$

$$W^U = U(\theta^{\sim})n^H + U(\theta^{\sim L})n^L - C_2(\theta^{\sim})n^H - C_1(\theta^{\sim L})n^L. \qquad \text{(A2.11)}$$

Welfare without the UBR imposed is the sum of enrollees' total utility in counties L and H, and $M+CO_1$'s profit in counties L and H.

$$W^N = [U(\theta^{\sim}) - R^H]n^H + [U(\theta^{\sim L}) - R^L]n^L + [R^H - C_1(\theta^{\sim})]n^H + [R^L - C_1(\theta^{\sim L})]n^L.$$

$$W^N = U(\theta^{\sim})n^H + U(\theta^{\sim L})n^L - C_1(\theta^{\sim})n^H - C_1(\theta^{\sim L})n^L. \qquad \text{(A2.12)}$$

From (A2.11) and (A2.12), $W^U \oplus W^N$ as

$$U(\theta^{\sim})n^H + U(\theta^{\sim L})n^L - C_2(\theta^{\sim})n^H - C_1(\theta^{\sim L})n^L \oplus U(\theta^{\sim})n^H + U(\theta^{\sim L})n^L - C_1(\theta^{\sim})n^H - C_1(\theta^{\sim L})n^L$$

$$\Rightarrow \qquad - C_2(\theta^{\sim}) \oplus - C_1(\theta^{\sim}) \qquad \text{(A2.13)}$$

(A2.13) reveals that since $C_2(\theta^{\sim}) > C_1(\theta^{\sim})$, welfare is greater without the UBR. The less efficient M+CO provides benefits to county H, and the level of benefits to counties L and H is the same with UBR as is provided without the UBR.

Therefore, the assumption $[R^L - C_2(\theta)]n^L < 0 \; \forall \; \theta$ does not affect the main conclusions of this paper.

Definition: The welfare maximizing level of benefits is that level at which marginal utility equals marginal cost.[5]

1) Welfare is the sum of enrollees' total utility in counties H and L, and M+CO$_1$'s profits from operating in counties H and L.[6]

$$W = [U(\theta) - R^H]n^H + [U(\theta) - R^L]n^L + [R^H - C_1(\theta)]n^H + [R^L - C_1(\theta)]n^L.$$

Differentiating with respect to benefits offered (θ),

$$\frac{\partial W}{\partial \theta} = U_\theta(\theta)n^H + U_\theta(\theta)n^L - C_\theta(\theta)n^H - C_\theta(\theta)n^L \leq 0.$$

$$= U_\theta(\theta)[n^H + n^L] = C_\theta(\theta)[n^H + n^L]$$

$$= U_\theta(\theta) = C_\theta(\theta) \tag{A2.12}$$

When the UBR is imposed, the welfare maximizing level of benefits satisfies marginal utility equals marginal cost (A2.12).

2) If the UBR is not imposed, benefits offered in county L may differ from benefits offered in county H. Welfare is the sum of enrollees' total utility in counties H and L, and M+CO$_1$'s profits from operating in counties H and L.

$$W = [U(\theta^H) - R^H]n^H + [U(\theta^L) - R^L]n^L + [R^H - C_1(\theta^H)]n^H + [R^L - C_1(\theta^L)]n^L.$$

Differentiating with respect to benefits offered in county H (θ^H),

$$\frac{\partial W}{\partial \theta^H} = U_\theta(\theta^H)n^H - C_\theta(\theta^H)n^H \leq 0.$$

$$= U_\theta(\theta^H) = C_\theta(\theta^H) \tag{A2.13}$$

Similarly, differentiating with respect to benefits offered in county L (θ^L),

---

[5] By assumption, the utility and cost functions are continuous and possess a continuous derivative, therefore the first order condition is taken as a necessary condition for identifying the optimum.

[6] The social planner always prefers that M+CO$_1$ serves both counties, therefore $\theta_i = \theta_1 \equiv \theta$.

$$\frac{\partial W}{\partial \theta^L} = U_\theta(\theta^L)n^L - C_\theta(\theta^L)n^L \leq 0.$$

$$= U_\theta(\theta^L) = C_\theta(\theta^L) \qquad \text{(A2.14)}$$

Without the UBR, welfare is again maximized at the level of benefits at which marginal utility equals marginal cost. Since by assumption enrollee's utility and M+COs' costs are the same across counties, (A2.13) = (A2.14) $\Rightarrow$ the welfare maximizing level of benefits for both counties satisfies (A2.12).

Appendix A.3 This appendix contains proofs relevant to Chapter 2 on the existence of equilibria with and without the uniform benefits requirement when M+COs have equal costs. It considers all possible county configurations in determining that unless $R^L = C_i^L(\theta_i)$ and $R^H = C_i^H(\theta_i)$, the only equilibrium occurs with two M+COs in two counties without the UBR imposed.

Assume $R^k > C_i^k(\theta_0)\ \forall\ i,j = 1,2$, and all $k \in \{L, H\}$.

Assume county L is less profitable than county H: $R^L - C_i^L(\theta_i^k) < R^H - C_i^H(\theta_i^H)\ \forall\ i,j = 1,2$.

Assume it is not the case that both $R^L = C_i^L(\theta_i)$ and $R^H = C_i^H(\theta_i)\ \forall\ i,j = 1,2$.

Assume $C_i^k(\theta) = C_j^k(\theta)\ \forall\ i,j = 1,2,\ k \in \{L, H\}$

Each M+CO must earn non-negative profits to operate: $\pi_i \geq 0\ \forall\ i,j = 1,2,\ k \in \{L, H\}$.

These assumptions will be maintained throughout Appendix A.3.

Lemma C1: Suppose the two M+COs have identical operating costs and the UBR is not imposed. Then in equilibrium, the level of benefits supplied will exhaust all profit, i.e. $R^k = C_i^k(\theta_i^k)\ \forall\ i,j = 1,2,\ i \neq j,\ k \in \{L, H\}$. (A3.1)

If $\theta_i = \theta_j$, then $\pi_i = [R^k - C_i^k(\theta_i)]n^k/2$ for all $i,j = 1,2$, $k \in \{L, H\}$.

If $\theta_i = \theta_j + \varepsilon$, then $\pi_i = [R^k - C_i^k(\theta_i)]n^k$ for all $i,j = 1,2$, $k \in \{L, H\}$.

As long as the profit from serving n^k is positive, i.e. $[R^k - C_i^k(\theta_i)]n^k > 0$, each M+CO has an incentive to offer slightly more benefits than its competitor in order to capture the county. This can be seen by noting that $[R^k - C_i^k(\theta_i)]n^k > [R^k - C_i^k(\theta_i)]n^k/2$ for all $i,j = 1,2$, $k \in \{L, H\}$. The result is that each M+CO offers increasingly greater benefits until $R^k = C_i^k(\theta_i)$, which implies $\theta_i = \theta_j$ and $\pi_i^k = \pi_j^k = 0$ $\forall$ $i,j = 1,2$, $k \in \{L, H\}$. In this perfectly competitive county, profits of both M+COs go to zero.

Without the UBR, M+COs compete in both the high and low payment counties without necessarily offering uniform benefits across counties. Each M+CO considers each county separately. M+COs compete away all profit as they increase benefits to obtain county share. The result is that benefits are bid up to the highest profitable level, where the cost to provide the benefits equals the payment.

Lemma C2: Suppose the uniform benefits requirement is imposed. Then the situation in which both M+COs operate in both high and low payment counties is not an equilibrium.

Suppose both M+COs are operating in both counties as described above. Then suppose UBR is imposed. Since by assumption the level of benefits that solves equation (A3.1) is different for each county, the M+COs must choose a different level of benefits in at least one county that they can provide equally to both counties.

It might seem logical to provide benefits at a level somewhere in between the levels initially provided by the M+COs to the high and low payment counties. But, lowering the benefits provided in the high payment county leaves room for a competitor to offer slightly higher benefits and win the entire county. Increasing benefits in the low payment county results in a loss, since M+COs already are supplying the maximum possible profitable level of benefits. This dilemma creases an incentive for a M+CO to leave the low payment county because by doing so, it is able to offer greater benefits and can capture the entire high payment county. Therefore, the situation in which both M+COs operate in both the high and low payment counties under the UBR is not an equilibrium.

1) M+COs offer the highest profitable θ when in competition. If $\theta_i = \theta_j$, then $\pi_i = [R^k - C_i^k(\theta_i)]n^k/2$ for all $i,j = 1,2$, $k \in \{L, H\}$. If $\theta_i = \theta_j + \varepsilon$, then $\pi_i = [R^k - C_i^k(\theta_i)]n^k$ for all $i,j = 1,2$, $k \in \{L, H\}$.

As long as the profit from serving n^k is positive, i.e. $[R^k - C_i^k(\theta_i)]n^k > 0$, each M+CO has an incentive to offer slightly more benefits than its competitor in order to capture the county. This can be seen by noting that

$[R^k - C_i^k(\theta_i)]n^k > [R^k - C_i^k(\theta_i)]n^k/2$ for all $i,j = 1,2$, $k \in \{L, H\}$. The result is that each M+CO offers increasingly greater benefits until $R^k = C_i^k(\theta_i)$, which implies $\theta_i = \theta_j$ and $\pi_i^k = \pi_j^k = 0 \ \forall\, i,j = 1,2$, $k \in \{L, H\}$.

This implies that a M+CO operating in both counties will offer θ such that $R^L = C^L(\theta_i)$ and $R^H \geq C^H(\theta_i)$.

2) By assumption, $C_i^k(\theta_i) = C_j^k(\theta_i) \ \forall\, i,j = 1,2$, $k \in \{L, H\}$.

$\Rightarrow \quad [R^k - C_i^k(\theta_i)] = [R^k - C_j^k(\theta_j)] \ \forall\, i,j = 1,2$, $k \in \{L, H\}$.

⇒ $\theta_i = \theta_j$ and M+COs evenly divide the county such that $q_i^k(\theta_i^k, \theta_j^k) = n^k/2$.

⇒ $\pi_i^H = \pi_j^H \geq 0$ and $\pi_i^L = \pi_j^L = 0$.

⇒ $\pi_i^{H+L} = [R^H - C^H(\theta_i)]n^H/2 + [R^L - C^L(\theta_i)]n^L/2$ where $[R^L - C^L(\theta_i)]n^L/2 = 0$.

3) Suppose while M+CO j continues to offer θ_j, M+CO i offers $\theta_i^{\sim} > \theta_j$ subject to $R^H - C^H(\theta_i^{\sim}) \geq 0$. Then $\pi_i^H > \pi_j^H = 0$ and $\pi_i^L < \pi_j^L = 0$. Since θ_i is chosen such that $R^L = C^L(\theta_i)$, $\theta_i^{\sim} > \theta_j$ implies that $C^L(\theta_i^{\sim}) > C^L(\theta_i)$ which implies that $R^L < C^L(\theta_i^{\sim})$.

4) Comparing M+CO i's profit at the new $(\theta_i^{\sim})$ versus the initial (θ_i):

$[R^H - C^H(\theta_i^{\sim})]n^H + [R^L - C^L(\theta_i^{\sim})]n^L > [R^H - C^H(\theta_i)]n^H/2 + [R^L - C^L(\theta_i)]n^L/2$,

but $[R^L - C^L(\theta_i^{\sim})] < 0$

⇒ $[R^H - C^H(\theta_i^{\sim})]n^H > [R^H - C^H(\theta_i^{\sim})]n^H + [R^L - C^L(\theta_i^{\sim})]n^L$ and

$[R^H - C^H(\theta_i^{\sim})]n^H > [R^H - C^H(\theta_i)]n^H/2$

By increasing $\theta_i^{\sim} > \theta_j$ and exiting county L, M+CO i increases profits. There is an incentive for a M+CO to leave the low payment county and to offer greater benefits to capture the high payment county. Therefore, both M+COs operating in both counties under the UBR does not constitute an equilibrium.

Lemma C3: When M+COs have identical operating costs, county structures in which both M+COs operate in only one county, one M+CO operates in each county, or one M+CO operates in only one county and one M+CO operates in both counties cannot constitute an equilibrium. This is the case whether or not the uniform benefits requirement imposed.

This proof proceeds by considering four distinct cases, labeled A, B, C and D.

Case A) Both M+COs operating in the same county.

Suppose M+COs i and j operating in county H.

By Lemma C1, $\theta_i = \theta_j$, and $\pi_i^H = \pi_j^H = 0$.

$\Rightarrow \quad \pi_i^H = [R^H - C^H(\theta_i)]n^H/2$ and $\pi_j^H = [R^H - C^H(\theta_j)]n^H/2$.

By exiting county H and entering county L, M+CO i earns $\pi_i^L = [R^L - C^L(\theta_0)]n^L \geq [R^H - C^H(\theta_i)]n^H/2$, since M+CO i offers only basic benefits when there is no competition. $\pi_i^L = [R^L - C^L(\theta_0)]n^L$ provides M+CO i the maximum possible profit in county L. There is an incentive for each M+CO to exit the competitive county in which profits are bid to zero and to operate only in the profitable county L.

The symmetric case applies for both M+COs operating in county L initially. Therefore, both M+COs operating in one county does not constitute an equilibrium.

Case B) One M+CO operating in each county.

Suppose M+CO i operating in county H and M+CO j operating in county L.

If $C(\theta) > C(\theta_0)$, then $[R^k - C(\theta)] < [R^k - C(\theta_0)]$, $k \in \{L, H\}$.

$\Rightarrow \pi^k(\theta) < \pi^k(\theta_0)$, $k \in \{L, H\}$.

Therefore, each M+CO offers the minimum benefits necessary when not faced with competition: $\theta_i = \theta_0$ and $\theta_j = \theta_0$. If M+CO j enters county H and offers θ_0, M+CO j captures 1/2 of county H.

$\Rightarrow \pi_j^{H+L} = [R^L - C^L(\theta_0)]n^L + [R^H - C^H(\theta_0)]n^H/2 > [R^L - C^L(\theta_0)]n^L = \pi_j^L$

$\forall$ i,j = 1,2, i $\neq$ j.

Therefore, M+CO j has an incentive to enter county H and by symmetry, M+CO i has an incentive to enter county L, and an equilibrium does not exist.

Case C) One M+CO operating in county H and one M+CO operating in both counties H and L.

1) Suppose M+CO i in county H. $\pi_i^H = [R^H - C^H(\theta_i)]n^H/2$

2) Suppose M+CO j in counties L and H. $\pi_j^{H+L} = [R^H - C^H(\theta_i)]n^H/2 + [R^L - C^L(\theta_j)]n^L$.

   Since $[R^H - C^H(\theta_i)]n^H \geq 0$ to operate, but $R^H \neq C^H(\theta_i)$, $R^H > C^H(\theta_i)$. By Lemma CI, M+COs provide $\theta_i = \theta_j$ in county H and divide the county evenly.

3) Suppose while M+CO j continues to offer θ_j, M+CO i in county H offers $\theta_i^{\sim} > \theta_i = \theta_j$.

   Then by assumption, $C^H(\theta_i^{\sim}) > C^H(\theta_i)$.

   $\Rightarrow \quad [R^H - C^H(\theta_i^{\sim})] < [R^H - C^H(\theta_i)]$.

4) Assume there exists some ε such that $C^H(\theta_i^{\sim}) = C^H(\theta_i) + \varepsilon$, so that $[R^H - C^H(\theta_i^{\sim})] > 0$. Then $[R^H - C^H(\theta_i^{\sim})]n^H \geq [R^H - C^H(\theta_i)]n^H/2$. M+CO i has an incentive to increase θ_i above θ_j. Given the same cost structure, both M+COs will compete in county H by offering higher θ.

5) Suppose M+CO i can offer some $\theta_i^{\sim}$ for which $[R^H - C^H(\theta_i^{\sim})] > 0$ but $[R^L - C^L(\theta_i^{\sim})] < 0$.

   $\Rightarrow \quad [R^L - C^L(\theta_j)] < 0$ if $\theta_i^{\sim} = \theta_j$.

   Then $\pi_i^H = [R^H - C^H(\theta_i^{\sim})]n^H$ and $\pi_j^{H+L} = [R^H - C^H(\theta_j)](0) + [R^L - C^L(\theta_j)]n^L$.

   Since by assumption, M+COs must earn nonnegative profits, $\pi_j^{H+L} = 0 \leq \pi_j^H = [R^H - C^H(\theta_j)]n^H/2$. M+CO j has an incentive to exit county H and offer $\theta_j = \theta_0$ such that $+ [R^L - C^L(\theta_0)]n^L \geq 0$ if $[R^L - C^L(\theta_0)]n^L > [R^H - C^H(\theta_j^{\sim})]n^H/2$; or M+CO j has an incentive to exit county L and raise θ_j such that $[R^H - C^H(\theta_j)]n^H/2 \geq 0$, if $[R^L - C^L(\theta_0)]n^L < [R^H - C^H(\theta_j^{\sim})]n^H/2$. M+CO i has an incentive to enter county L and offer $\theta_i^{\sim} = \theta_0 + \varepsilon$ since $\pi_i^{H+L} = [R^H - C^H(\theta_i)]n^H/2 + [R^L - C^L(\theta_i)]n^L > [R^H - C^H(\theta_i)]n^H/2$.

Therefore, one M+CO operating in county H only and M+CO operating in both counties is not an equilibrium.

Case D) One M+CO operating in county L and one M+CO operating in both counties H and L.

1) Suppose M+CO i in county L.

2) Suppose M+CO j in counties H and L. Since M+COs must earn non-negative profits to operate, $\pi_i^L = [R^L - C^L(\theta_i)]n^L/2$ and $\pi_j^{H+L} = [R^H - C^H(\theta_j)]n^H/2 + [R^L - C^L(\theta_j)]n^L/2$. By Lemma C1, M+COs compete in county L so that $\theta_i = \theta_j$ and $R^L = C^L(\theta_i)$ for all i,j = 1,2, but by assumption $R^L \rightarrow C^L(\theta_i)$.

3) Let $\theta_i^{\sim} = \theta_0 - \varepsilon$ and let $\theta_j^{\sim} = \theta_0 - \varepsilon$ where $\theta_i = \theta_j$ solves $R^L = C^L(\theta_i)$. Then $\pi_i^L = 0$ and $\pi_i^{H+L} > 0$ since $R^H > C^H(\theta_j^{\sim})$ when $(\theta_j^{\sim})$ is chosen such that $R^L = C^L(\theta_j) + \varepsilon$. M+CO i has an incentive to enter county H.

$\Rightarrow \quad \pi_i^L = [R^L - C^L(\theta_i^{\sim})]n^L/2 < \pi_i^{H+L} = [R^L - C^L(\theta_i^{\sim})]n^L/2 + [R^H - C^H(\theta_i^{\sim})]n^H/2$, where $[R^H - C^H(\theta_i^{\sim})]n^H/2 > 0$.

Therefore, one M+CO operating in county L only and one M+CO operating in both counties is not an equilibrium.

APPENDIX B
SUPPLEMENTARY DATA FOR CHAPTER 3

Appendix B.1 This appendix explains the reason for analyzing the number of plans per county rather than conducting a plan level analysis. The appendix also includes definitions of the types of plans offered prior to the BBA and explains the BBA's required changes to these plans.

HCFA's Medicare managed care market penetration files list plan names and plan contract numbers by county. Because providers were required to transition managed care plans from one type to another, it is not possible to compare plans across years by number. It is unclear if a plan in a county in one year is the same as one offered in that county in subsequent years or if a new entrant offered it. Consequently, the analysis in this paper considers the total number of plans in a county, and changes in the total number of plans in a county by type, however without regard to the identity of the provider. Following are definitions of the various plan types and the BBA's required changes to these plans.

- Risk plans are Medicare managed care plans under which the provider receives a pre-set capitated payment for each beneficiary enrolled in the its plan, regardless of services provided. Beneficiaries generally pay a set premium regardless of services received, and also pay a deductible and co-insurance. Risk contracts were eliminated after 12/31/98. The majority of risk contracts converted to M+COs, offering Part A and Part B coverage rather than Part B only (as most risk plans did).

- HCPP plans were Medicare managed care plans provided by an organization that is union or employer sponsored. The plan was not permitted to provide or arrange for provision of any inpatient hospital services. With HCPP plans, office visits were reimbursed by HCFA on a pre-paid capitated basis, and inpatient services were paid on a fee-for-service schedule. HCPPs did not include Part A, and could eliminate parts of Part B. HCPPs were eliminated as of 12/31/98 for entities eligible to participate as M+COs. Those remaining were required to meet the BBA's new definitions for an HCPP.[1] HCPPs that did not meet the new HCPP definition could convert to cost plans, but must have done so by January 1, 1999. The BBA prohibited HCFA from accepting new cost contracts other than current HCPP plans wishing to convert to cost plans.
- Cost contracts are Medicare managed care plans under which the Medicare+Choice Organization is reimbursed by HCFA based on actual costs incurred for providing Medicare covered services to its beneficiaries. Beneficiaries may pay the Medicare+Choice Organization based on services received, or may pay a set premium regardless of services. Doctor visits were paid on a capitated basis, while hospital services are paid on a Medicare fee-for-service schedule. These plans were required to offer Part A and Part B, and enrollees were permitted to obtain services from doctors outside the plan. Cost contracts were permitted a longer time to convert, however all cost contracts sunset on 12/31/02. Additionally, the same firm was not permitted to administer concurrent cost and M+CO contracts with open enrollment in the same geographic area (in order to avoid risk selection as explained earlier). Those

firms with cost and managed care plans in the same geographic area had to transition cost members to the M+CO plan by 1/1/99 or allow those enrollees to disenroll by 12/31/98, or else maintain (no new enrollees) until 12/31/02 when all must convert or disenroll.

- The final private insurance option for Medicare beneficiaries is fee-for-service (FFS), in which a private insurance plan accepts Medicare beneficiaries. Medicare pays a set amount every month to the private insurance company. Enrollees are permitted to use any doctor or hospital, and the insurance plan (rather than the Medicare program) decides how much each party pays for services. There is generally an annual deductible that must be paid before the private FFS plan begins to pay. This option is still available to Medicare beneficiaries.
- Original Medicare by which the beneficiary pays per visit to any doctor or hospital accepting Medicare serves beneficiaries not enrolled in any plan. Eligible Medicare beneficiaries are charged a fee for each health service received. Beneficiaries may go to any doctor, specialist or hospital that accepts Medicare. Generally a fee is charged each time. Beneficiaries must pay the monthly Medicare Part B premium, and there are deductible and co-insurance requirements. Original Medicare did not change with the BBA.
- One additional type of plan included in this paper is the demonstration plan. These existed prior to and after the BBA. HCFA authorizes a limited number of Medicare providers to offer Medicare covered services in a plan not subject to the standard Medicare+Choice Organization requirements. These plans are often used to

---

[1] The BBA's new definition for an HCPP is that the organization must be union or employer sponsored, and it may not provide or arrange for the provision of any inpatient hospital services.

determine the efficiency and affordability of a new method of providing Medicare covered services. While not classified as any formal type of plan, they have been included in the analysis because of the number of beneficiaries they serve. The rules for these plans are considered on a case by case basis.

- Medicare+Choice plans were instituted by the BBA. These plans offer health benefits under a policy that includes a specific set of health benefits offered at a uniform premium level of co-payment(s), co-insurance, deductible(s) to all Medicare beneficiaries residing in the service area of the M+C plan. Multiple M+C plans may be offered. These plans may include a different pricing structure and/or different additional benefits, but must be offered to every Medicare beneficiary throughout the service area at a uniform premium level to all beneficiaries in the service area of that plan. Essentially, the requirement states that a uniform array of services be offered at a uniform premium to all beneficiaries who reside in the service area.

Appendix B.2 This appendix includes difference-in-difference tables that support the hypothesis that the BBA did affect provider participation.

At first inspection, the effect(s) of the BBA is not apparent. This is the case when all counties within the US are included. In initial difference-in-difference analysis, while the change in the number of plans per county differed between 1997 and 1999 from the change in number of plans per county between 1995 and 1997, the latter span of years also differed from changes that took place from 1993 to 1995. These data provide little support for the hypothesis that the BBA affected the number of plans per county. When the data are refined to exclude those counties in which managed care providers did not operate initially (i.e. in 1993), the results change. Including such counties in the analysis only serves to mask underlying effects of the BBA on M+C providers.

Following are analyses that consider the effects of the BBA on the number of plans per county in counties that gained one plan, two plans and three or more plans, as well as counties that lost one, two, or three or more plans. I also considered whether theses results would continue to apply if I considered those counties with zero plans in 1993, and continued with this analysis to counties with five or more plans in 1993. I segregated the data based on population, urban classification, and payment rates. In each case, the changes from 1997 to 1999 when considering only those counties with plans in 1993, is significantly different from the changes in plans from 1995 to 1997.[2] Conversely, the change in number of plans per county from 1995 to 1997 is not significantly different from the change in the number of plans from 1993 to 1995. These analyses provide substantial support for the hypothesis that the BBA caused a change in provider participation.

---

[2] 636 counties had plans in 1993. This number represents a very small subset of the data. Other tables included in Appendix B.2 allow for inclusion of a greater portion of counties with the same results. While limitations of the data set may seem drastic, it is important to remember that the BBA could cause exit only in those counties that initially attracted managed care plans.

Table B.2-1
Comparison of the Average Change in Number of Plans Per County Over the Relevant Years, Segmented by Per Capita Income

	Mean Change in Plans 1999-1997	Mean Change in Plans 1997-1995	Difference (1999-1997) - (1997-1995) [standard error]	Mean Change in Plans 1995-1993	Difference (1997-1995) - (1995-1993) [standard error]	Difference in Difference, partialing out county trends
All counties	-0.032	0.270	-0.302*** (0.017)	0.106	0.165*** (0.018)	-0.467*** (0.031)
Per Capita Income - top quarter[a]	-0.046	0.139	-0.185*** (0.026)	0.043	0.096*** (0.020)	-0.085*** (0.025)
Per Capita Income - second quarter	0.018	0.166	-0.148*** (0.027)	0.078	0.088*** (0.023)	-0.239*** (0.042)
Per Capita Income - third quarter	-0.041	0.254	-0.295*** (0.032)	0.114	0.140*** (0.028)	-0.467*** (0.031)
Per Capita Income - bottom quarter	-0.060	0.522	-0.582*** (0.045)	0.188	0.335*** (0.056)	-1.047*** (0.094)
Given a positive number of plans in 1993.						
Per Capita Income - top quarter	-0.105	0.053	-0.158 (0.068)	0.026	0.026 (0.058)	-0.270** (0.104)
Per Capita Income - second quarter	-0.140	0.225	-0.364*** (0.091)	0.116	0.109 (0.081)	-0.282* (0.114)
Per Capita Income - third quarter	-0.201	0.290	-0.491*** (0.090)	0.254	0.036 (0.076)	-0.785*** (0.094)
Per Capita Income - bottom quarter	-0.286	0.692	-0.978*** (0.096)	0.205	0.487** (0.160)	-1.309*** (0.203)

*** = significant at .001

** - significant at .005

* = significant at .01

a. Per Capita Income indicates counties with the greatest to the least per capita income based on 1993 rates.

Table B.2-2
Comparison of the Average Change in Number of Plans Per County
Over the Relevant Years, Segmented by Population

	Mean Change in Plans 1999-1997	Mean Change in Plans 1997-1995	Difference (1999-1997) - (1997-1995) [standard error]	Mean Change in Plans 1995-1993	Difference (1997-1995) - (1995-1993) [standard error]	Difference in Difference, partialing out county trends
All counties	-0.032	0.270	-0.302*** (0.017)	0.106	0.165*** (0.018)	-0.467*** (0.031)
Population - top quarter	-0.004	0.060	-0.064*** (0.018)	0.018	0.042** (0.015)	-0.106*** (0.033)
Population - second quarter	-0.031	0.106	-0.136*** (0.022)	0.043	0.063*** (0.018)	-0.199*** (0.039)
Population - third quarter	-0.020	0.240	-0.260*** (0.032)	0.085	0.154*** (0.025)	-0.415*** (0.054)
Population - bottom quarter	-0.074	0.675	-0.749*** (0.050)	0.276	0.399*** (0.058)	-1.148*** (0.096)

Counties with Plans in 1993

	Mean Change in Plans 1999-1997	Mean Change in Plans 1997-1995	Difference (1999-1997) - (1997-1995) [standard error]	Mean Change in Plans 1995-1993	Difference (1997-1995) - (1995-1993) [standard error]	Difference in Difference, partialing out county trends
All counties	-.201	.376	-.577*** (.048)	.168	.208*** (.064)	-.785*** (.094)
Population - top quarter	-.118	.039	-.158 (.087)	-.066	.105 (.083)	-.263 (.165)
Population - second quarter	-.211	.088	-.298*** (.083)	.044	.044 (.061)	-.342** (.130)
Population - third quarter	-.152	.171	-.323*** (.073)	.104	.067 (.061)	-.390*** (.119)
Population - bottom quarter	-.248	.702	-.950*** (.087)	.319	.382** (.132)	-1.333*** (.184)
Top quarter vs. bottom quarter	0.130 (0.122)	-0.663*** (0.124)	0.792*** (0.172)	-0.385 (0.226)	-0.278 (0.200)	-0.550*** (0.108)
Top half vs. bottom half	0.039 (0.074)	0.438*** (0.072)	0.478*** (0.117)	0.240 (0.117)	-0.198 (0.134)	-0.213*** (0.054)

*** = significant at .001

** - significant at .005

* = significant at .01

Table B.2-3
Comparison of the Average Change in Part A Payment Rates and the Average Change in Part B Payment Rates Over the Relevant Years

Mean Change in Part A Rate 1999-1997	Mean Change in Part B Rate 1999-1997	Diff-in-Diff (Part A) - (Part B) [standard error]	Diff-in-Diff (PartA'99-'97 - PartB'99-'97) - (PartA'97-'95 - PartB'97-'95) [standard error]
-15.63	48.21	-63.85*** (0.56)	-92.31*** (0.52)
Mean Change in Part A Rate 1997-19957	Mean Change in Part B Rate 1997-1995	Diff-in-Diff (Part A) - (Part B) [standard error]	Diff-in-Diff (PartA'97-'95 - PartB'97-'95) - (PartA'95-'93 - PartB'95-'93) [standard error]
45.40	16.93	28.47*** (0.43)	7.82*** (0.60)
Mean Change in Part A Rate 1995-1995	Mean Change in Part B Rate 1995-1993	Diff-in-Diff (Part A) - (Part B) [standard error]	
25.50	4.85	20.65*** (0.35)	
Given a positive number of plans in 1993.			
Mean Change in Part A Rate 1999-1997	Mean Change in Part B Rate 1999-1997	Diff-in-Diff (Part A) - (Part B) [standard error]	Diff-in-Diff (PartA'99-'97 - PartB'99-'97) - (PartA'97-'95 - PartB'97-'95) [standard error]
-18.54	47.11	-65.65*** (1.17)	-96.47*** (1.09)
Mean Change in Part A Rate 1997-19957	Mean Change in Part B Rate 1997-1995	Diff-in-Diff (Part A) - (Part B) [standard error]	Diff-in-Diff (PartA'97-'95 - PartB'97-'95) - (PartA'95-'93 - PartB'95-'93) [standard error]
45.95	15.14	30.82*** (0.87)	8.42*** (1.33)
Mean Change in Part A Rate 1995-1995	Mean Change in Part B Rate 1995-1993	Diff-in-Diff (Part A) - (Part B) [standard error]	
26.17	3.77	22.40*** (0.78)	

*** = significant at .001
** = significant at .005
* = significant at .01

APPENDIX C
GLOSSARY

Balanced Budget Act (BBA): The 1997 BBA affected the health care industry through four new pieces of legislation: a Medicare Supplement, the Children's Health Insurance Program, Long-Term Care Insurance, and the Medicare+Choice Program. This paper addresses the changes due to the establishment of the Medicare+Choice program, which was designed to significantly expand health care options available to Medicare beneficiaries.

Capitation: The method of payment whereby a physician or hospital is paid a fixed amount for each person in a particular plan regardless of services provided.

Coinsurance: After the insured meets a specified deductible, the insurer and the insured share payment for losses covered by the policy.

Cost Plan: A Medicare managed care plan under which the Medicare+Choice Organization is reimbursed by HCFA based on actual costs incurred for providing Medicare covered services to its beneficiaries. Beneficiaries may pay the Medicare+Choice Organization based on services received, or may pay a set premium regardless of services.

Deductible: The amount the insured must pay before the insurer will pay for benefits or services.

Demonstration Plan: HCFA authorizes a limited number of Medicare providers to offer Medicare covered services in a plan not subject to the standard Medicare+Choice

Organization requirements. These plans are often used to determine the efficiency and affordability of a new method of providing Medicare covered services.

Eligibility: An individual is eligible to participate in a Medicare+Choice Plan if he is eligible to receive Medicare, has both Medicare Part A and Part B, and lives within the plan's service area. Individuals with end stage renal disease are not eligible to participate. To be eligible for Medicare Part A without a premium, and Medicare Part B, an individual must be aged 65 or over, have 40 quarters of employment (or a spouse with 40 quarters of employment), and be a US citizen or permanent US resident. Some disabled individuals and individuals with end stage renal disease are also eligible.

Health Care Financing Administration (HCFA): Administers the original Medicare and Medicare+Choice Programs under the Department of Health and Human Services.

Health Care Prepayment Plan (HCPP): A Medicare managed care plan provided by an organization that is union or employer sponsored. The plan is not permitted to provide or arrange for provision of any inpatient hospital services.

Health Maintenance Organization (HMO): An organization that provides a range of health care services for a specified group for a fixed prepayment.

Medicare: The government health insurance program for people aged 65 or older, some people under age 65 with disabilities, and people with end stage renal disease. Medicare provides hospital benefits and medical benefits, and is administered by the Health Care Financing Administration.

Medicare Managed Care Plan: A health plan offered by a private insurance company to individuals eligible to receive Medicare. Medicare pays a set amount of money each month to the private insurance company. Beneficiaries often get benefits in excess of benefits covered by original Medicare, but may go only to contracted doctors and hospitals that agree to treat members of the plan. Enrollees pay for coverage in advance instead of for each service as needed.

Medicare+Choice Organization (M+CO): A private insurance company that elects to take part in the Medicare+Choice Program and receives a contract from HCFA to offer a Medicare+Choice Plan.

Medicare+Choice Plan (M+C plan): Health benefits coverage offered under a policy by a M+CO which includes a specific set of health care benefits offered at a uniform premium and uniform level of co-payment(s), co-insurance, and deductible(s) to all Medicare beneficiaries residing in the plan's service area.

Medicare+Choice Program (M+C Program): The program beginning January 1, 1998, under which eligible individuals may elect to receive benefits through enrollment in one of a number of private health plan choices beyond the original Medicare program. Among the alternatives are the M+C coordinated care plans (including plans offered by health maintenance organizations and preferred provider organizations), M+C "MSA" plans (a combination of a high deductible M+C health insurance plan and a contribution to a M+C medical savings account) and M+C private fee-for-service plans.

Original Medicare (or fee-for-service): Eligible Medicare beneficiaries are charged a fee for each health service received. Beneficiaries may go to any doctor, specialist or hospital that accepts Medicare. Generally a fee is charged each time. Beneficiaries must pay the monthly Medicare Part B premium. There are deductible and co-insurance requirements.

Medicare Part A: The part of Medicare that provides hospital insurance. Eligible Medicare beneficiaries receive Part A coverage without paying a premium if they or a spouse has 40 or more quarters of Medicare covered employment. Otherwise, Part A coverage may be purchased for a monthly fee. There is a deductible per benefit period and co-insurance payments. Part A covers hospital stays, skilled nursing facility care, some home health care, some hospice care, and blood.

Medicare Part B: The part of Medicare that provides medical insurance. Eligible Medicare beneficiaries pay a monthly premium for Part B coverage, and a deductible. Part B covers medical services (doctors' services), clinical laboratory services, some home healthcare, outpatient services, and blood.

Payment Rate: HCFA pays M+COs for each enrollee in their M+C plan a monthly payment equal to 1/12 of the county-wide capitation rate that applies for the county in which the enrollee lives, adjusted by demographic factors applicable to that enrollee.

Plan: Specific health benefits, terms of coverage, and pricing structure offered by a M+CO.

Preferred Provider Organization (PPO): A plan through which a sponsoring group (for example an employer) negotiates price discounts with providers in exchange for patients.

Private Fee-for-Service: A Medicare health plan offered by a private insurance company. Medicare pays a set amount every month to the private insurance company. The beneficiary and the insurance company pay for each doctor visit or service required. The insurance company, rather than the Medicare program, decides how much each party pays.

Risk Plan: Medicare managed care plan that received a pre-set capitated payment for each beneficiary enrolled in the M+CO's plan, regardless of services provided. Beneficiaries generally paid a set premium regardless of services received, and may also have paid a deductible and co-insurance. All risk plans sunset 12/31/1998.

Service Area: The geographic area within which a beneficiary must reside in order to enroll in a M+C plan. The service area defines the area where a uniform benefit package (services and costs) is offered. Service area determination is applied to the level of the Medicare+Choice plan, and not at the organization level. Service area determines the payment rate based on the counties included, affects which benefits will be provided, and determines which Medicare beneficiaries are able to elect a plan. Generally a M+C plan's service area consists of whole counties.

Uniform Benefits Requirement (UBR): Requirement that premiums and benefits be uniform for all beneficiaries throughout a Medicare

REFERENCES

Anton, James J., James H. Vander Weide, and Nikolaos Vettas. "Strategic Pricing and Entry Under Universal Service and Cross-Market Price Constraints," The Fuqua School of Business, Duke University, April 1998.

Cawley, John, Chernew, Michael, and McLaughlin, Catherine. "HMO Participation in Medicare Managed Care," http://www.umich.edu/~jcawley, January 17, 2001.

Crew, Michael A., and Paul R. Kleindorfer. "Efficient Entry, Monopoly, and the Universal Service Obligation in Postal Service," *Journal of Regulatory Economics*, 14(2) September 1998, pages 103-125.

Department of Health and Human Services, Health Care Financing Administration. Federal Register, 42 CFR Part 400. Medicare Program; Establishment of the Medicare+Choice Program; Final Rule, June 26, 1998.

Department of Health and Human Services, Health Care Financing Administration. Federal Register, Vol. 63, No. 123. Rules and Regulations, June 26, 1998.

Foster, Richard W. "Cost-Based Reimbursement and Prospective Payment: Reassessing the Incentives," *Journal of Health and Politics, Policy and Law*, Vol. 7, No. 2, Summer 1982, pages 407-420.

Foster, Richard W. "Cost-Shifting Under Cost Reimbursement and Prospective Payment," *Journal of Health Economics*, Vol. 4, No. 3, September 1985, pages 261-271.

Fuchs, Victor R. "Health Care for the Elderly: How Much? Who Will Pay for It?" *Health Affairs*, January/February 1999, Vol. 18, No. 1, pages 11-21.

Health Insurance Association of America. *Source Book of Health Insurance Data 1999-2000,* 1999.

Inter-university Consortium for Political and Social Research. "1990 US Census Population," http://www.ICPSR.umich.edu/archive.html, February 9, 2001.

Kahn, Charles N., III, and Hanns Kuttner. "Budget Bills and Medicare Policy: The Politics of the BBA," *Health Affairs*, January/February 1999, Vol. 18, No. 1, pages 37 – 47.

MedPAC. Report to Congress: Medicare Payment Policy, March 1999.

MedPAC. Report to Congress: Selected Medicare Issues, June 1999.

MedPAC Report to Congress. Medicare+Choice: Trends Since the Balanced Budget Act," March 2000.

Pear, Robert. "Clinton Plans to Intervene as H.M.O.'s Exit Medicare," *The New York Times*, Section A, page 28, October 8, 1998.

Public Law 106-113. "Medicare Amendments Since the 1999 Report," http://www.hcfa.gov/pubforms/tr/smi2000/seciia.htm, April 14, 2001.

United States General Accounting Office. Report to the Honorable John F. Kerry, U.S. Senate, Medicare HMO Enrollment: Area Differences Affected by Factors Other Than Payment Rates, GAO/HEHS-97-37, May 1997.

United States General Accounting Office. Testimony Before the Special Committee on Aging, U.S. Senate, Medicare Managed Care: HMO Rates, Other Factors Create Uneven Availability of Benefits, Statement of William J. Scanlon, Director, Health Financing and Public Health Issues, Health, Education, and Human Services Division, GAO/T-HEHS-97-133, May 19, 1997.

United States General Accounting Office. Report to the Special Committee on Aging, U.S. Senate, Medicare: Many HMOs Experience High Rates of Beneficiary Disenrollment, GAO/HEHS-98-142, April 1998.

United States General Accounting Office. Testimony Before the Committee on Finance, U.S. Senate, Medicare Options for Reform, Statement of William J. Scanlon, Director, Health Financing and Public Health Issues, Health, Education, and Human Services Division, GAO/T-HEHS-99-130, May 26, 1999.

University of Michigan Statistical Resources on the Web. "Demographics and Housing," http://www.lib.umich.edu/libhome/Documents.center/frame/stdemfr.html, February 9, 2001.

University of Virginia Geographical and Statistical Data Center. "US Per Capita Income by County," http://fisher.lib.virginia.edu.ccdb/county94.html, September 17, 2000.

Vladeck, Bruce, C. "The Political Economy of Medicare," *Health Affairs*, January/February 1999, Vol. 18, No. 1, pages 22-36.

Welch, W. Pete. "Growth in HMO Share of the Medicare Market, 1989-94." *Health Affairs*, Fall 1996, pages 201-214.

Wilensky, Gail R., and Joseph P. Newhouse. "Medicare: What's Right? What's Wrong? What's Next?" *Health Affairs*, January/February 1999, Vol. 18, No. 1, pages 92-106.

BIOGRAPHICAL SKETCH

I was born in Glen Rock, New Jersey, in 1967. Shortly thereafter, my family and I moved to Florida where we remained through my high school years. After high school I attended Hamilton College in Clinton, New York, and graduated in 1989 with a B.A. degree, double-majoring in economics and American studies. In 1992 I graduated from the London School of Economics in London, U.K., receiving a MSc degree in economic history. I returned to south Florida where I met my husband and married. In the fall of 1997, I enrolled in the University of Florida's graduate program in economics.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

David E.M. Sappington, Chairman
Lanzillotti-McKethan Eminent Scholar

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Chunrong Ai
Associate Professor of Economics

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

David Figlio
Associate Professor of Economics

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Steven Slutsky
Professor of Economics

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Heather Elms
Assistant Professor of Management

This dissertation was submitted to the Graduate Faculty of the Department of Economics in the College of Business Administration and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 2001

Dean, Graduate School